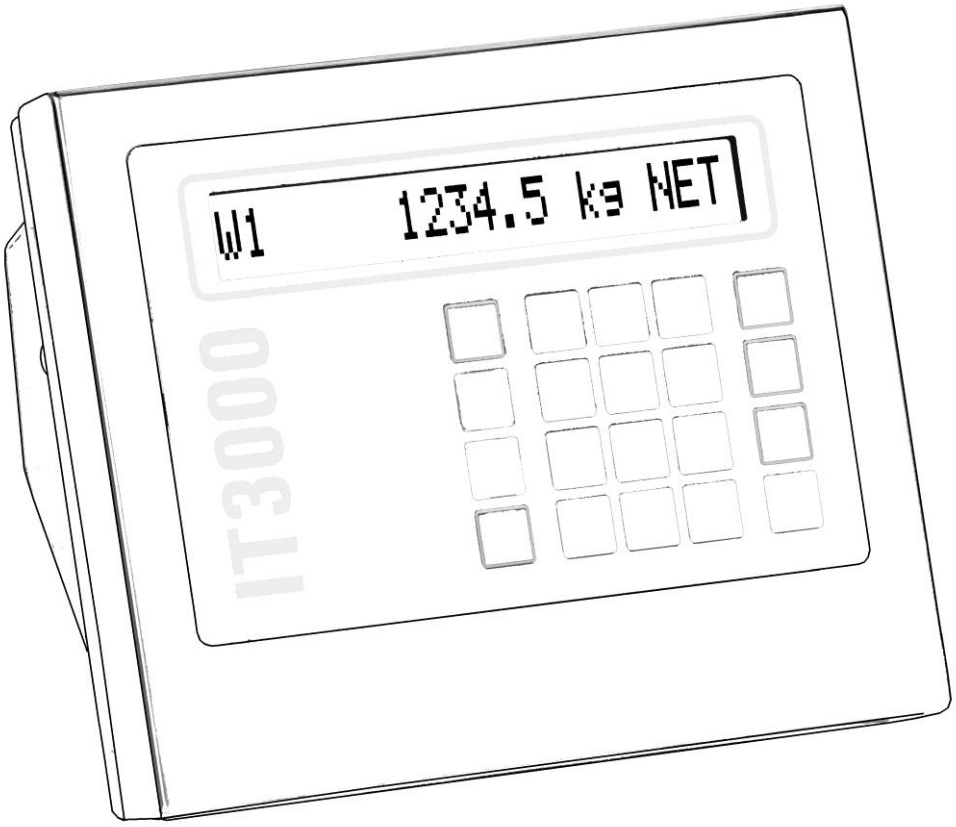
SysTec Systemtechnik und Industrieautomation GmbH

Technical Manual

IT3000M



Industrial Weighing Terminal

November 2014

Rev. 7

Technical Manual IT3000M

Date: November 25, 2014

File: IT3000M_THE.DOC

Program Version: as of 1.18

Program Version: as of firmware 'Update_20131105.1.IT468E'

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Published By:

Please Note:

While every precaution has been taken in the preparation of this manual, SysTec GmbH assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

The publisher is grateful for any information and/or advice that may contribute to correct errors or omissions in following editions.

Contents

1 Introduction

IT3000M is a universal industrial weighing terminal for weighing, data capture and batching applications. This manual contains information and Technical Data for installation and operation of the IT3000M-AC and IT3000M-DC industrial weighing terminal, referred to hereafter as IT3000M.

Further information is provided in the following manuals:

- **ADM / DUAL-ADM / ADM8000-Exi Calibration Manual, order-No.: ST.2309.0688**
- **Flintec / HBM Calibration Manual, order-No.: ST.2309.1568**
- **MultiRange Calibration Manual, order-No.: ST.2309.0057**

1.1 Safety Symbols Used In This Manual

Safety relevant information is shown with corresponding symbols as follows:

W A R N I N G
Failure to observe this precaution could result in serious injuries or fatal accidents. Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

CAUTION
Failure to observe this precaution could result in damage to or destruction of the equipment or bodily harm! Please make absolutely sure that these precautions are observed in order to ensure safe operation of the equipment.

Note: This indicates an advice for the designated use of the equipment and/or additional information to avoid inappropriate handling.

1.2 General Safety Advice

W A R N I N G
Disconnect all power to this instrument before opening the housing! Risk of electrical shock!

W A R N I N G
Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.
Failure to observe this precaution could result in bodily injury!

W A R N I N G
This unit must not be operated in a potentially explosive atmosphere!
It is the sole responsibility of the user to classify the area of installation and make sure that absolutely no potentially explosive atmosphere can be present at any time!

W A R N I N G
For the storage of volatile data the terminal contains a battery on the CPU board. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

CAUTION
If this device is used in an automatic or manual filling cycle, all users must provide a hard wired emergency stop circuit outside the device circuitry. Failure to observe this precaution could result in bodily injury!

CAUTION
When this unit is included as a component part of a system, the resulting system design must be reviewed by qualified personnel who are familiar with the construction and operation of all individual components in the system and the potential hazards involved. Failure to observe this precaution could result in bodily injury!

CAUTION
This unit must be installed, serviced, and operated in strict compliance with all locally applicable safety regulations and the rules for the prevention of accidents!

CAUTION
The power supply unit provides SELV voltages in accordance with EN 60950. Make sure that any peripheral device connected to the weighing terminal containing its own power supply also uses SELV voltages!

CAUTION
Input voltage of the instrument must comply with local mains supply!

CAUTION
This module and its associated equipment must be installed, adjusted and maintained by qualified personnel only!

CAUTION
If the line cord with connector is used as the means to separate the instrument from the mains, the wall outlet must be installed close to the instrument and must be easily accessible! If a permanently connected mains cable is used, an easily accessible separator must be included in the supply circuit!

W A R N I N G
The device uses the short-circuit / overcurrent protection of the on-site mains supply.

Compliance with the following safety instruction is mandatory for UL approved units:

CAUTION
For power supply of the IT3000M-DC use LPS and/or NEC class 2 power supply units only.

Note:

- **Only permit qualified personnel to operate this instrument!**
  Disconnect all power to this instrument before cleaning and servicing!
- **All switch gear connected to the unit and/or installed close to it, such as relays and contactors, must be fitted with appropriate components (RC-modules, diodes) to suppress interference.**
- **In order to avoid static discharge, all metallic parts of a system must be thoroughly grounded. Movable parts, such as portable scales on plastic wheels, must be grounded with earth clamps or earth leads of appropriate diameter.**
- **Keep this manual for future reference!**

1.3 Précautions d'emploi (ETL)

A V E R T I S S E M E N T
Retirez la fiche de réseau avant d'ouvrir l'appareil ou coupez le courant du terminal - Danger de mort!

A V E R T I S S E M E N T
Attention en actionnant les touches de commande des dispositifs de transport, trappe etc. Avant d'actionner ces toucher vérifiez que personne ne se trouve dans le périmètre d'action du mouvement.

A V E R T I S S E M E N T
L'IT3000M ne pourra être utilisé dans un environnement comportant un danger d'explosion. La classification correspondante est en tout cas l'obligation de l'utilisateur (division en catégories: zones, groupes d'explosion, catégories de température etc.). Adressez-vous à ce sujet aux autorités d'inspection locales et aux organismes de contrôle des normes de sécurité.

A V E R T I S S E M E N T
La structure du système doit être contrôlée par des experts qualifiés qui connaissent la construction et la fonction de tous les éléments connectés, si l'appareil fait partie d'un système global!

A V E R T I S S E M E N T
Pour l'installation, les travaux de maintenance et pendant l'utilisation, tenez compte des directives du VDE (association des électriciens allemands) et des consignes locales de sécurité et de prévention des accidents!

A V E R T I S S E M E N T
Le bloc d'alimentation fournit du côté sortie des tensions SELV (save electrical low voltage). En cas de raccordement de composants externes (interfaces sérielles, sorties parallèles), assurez-vous qu'il n'y a que des tensions SELV.

ATTENTION
La tension du réseau local doit correspondre à la tension d'entrée de l'appareil!

ATTENTION
Cet appareil et ses périphériques ne doivent être installés, ajustés et entretenus que par un personnel qualifié.

ATTENTION
La prise doit se trouver à proximité immédiate de l'appareil et son accès doit être facile, si l'on relie le terminal de pesage par un câble de réseau avec une fiche. Prévoir un dispositif de séparation facilement accessible au circuit d'alimentation, si la connexion est fixe.

ATTENTION
L'appareil utilise la protection contre les courts-circuits / dispositif de protection contre les surintensités des bâtiments installation sur site.

1.4 Declaration Of Conformity (EU)

SysTec Systemtechnik und Industrieautomation GmbH
Ludwig-Erhard-Str. 6
D-50129 Bergheim-Glessen

CE

Konformitätserklärung
Declaration of conformity
Déclaration de conformité

Die nichtselbsttätige Waage
The non-automatic weighing instrument
L'instrument de pesage à fonctionnement non automatique

III

Hersteller: *Manufacturer:* Fabricant:	SysTec GmbH
Typ/Modell: *Type/Model:* Type/modèle:	IT3000M
Nr. der EG-Bauartzulassung: *No of the EC type-approval certificate:* N° du certificat d'approbation CE de type:	D11-09-012

entspricht dem in der Bescheinigung über die Bauartzulassung beschriebenen Baumuster sowie den Anforderungen der folgenden Richtlinien:
Corresponds to the production model described in the EC type-approval certificate and to the requirements of the following EC directives:
Correspond au modèle décrit dans le certificat d'approbation CE de type, aux exigences des directives CE suivantes:

2009/23/EG	***2009/23/EC***	2009/23/CE
2004/108/EG	***2004/108/EC***	2004/108/CE
2006/95/EG	***2006/95/EC***	2006/95/CE

entsprechend den folgenden Normen/Empfehlungen:
in conformity with the following standards:
conforme aux normes suivantes:

EN 45501	OIML R76-1	
EN 61000-6-2	EN 61000-6-3	NAMUR NE21
EN 60950		

Nur gültig mit einer von einer Benannten Stelle erteilten Konformitätsbescheinigung.
Only valid with a Certificate of Conformity issued by a Notified Body.
Seulement valable avec une Attestation de Conformité délivré par une organisme notifié.

Unterschrift		**Datum:**	**23.05.2013**
Signature		*Date:*	*May 23, 2013*
Signature		Date:	23.05.2013

Dipl.-Ing. Rainer Junglas
Geschäftsführer / *General Manager* / Directeur

1.5 Declaration Of Conformity (US)

SysTec Systemtechnik und Industrieautomation GmbH
Ludwig-Erhard-Str. 6
D-50129 Bergheim-Glessen

The non-automatic weighing instrument, type	**IT3000M–AC** **IT3000M–DC**
Manufacturer	**SysTec GmbH**
No. of NTEP type-approval certificate	**NTEP CC No. 08-006 III / III L**

3162737

Conforms to UL STD 60950–1

Certified to CAN/CSA STD C22.2 No. 60950–1

Conforms to the requirements of the following standards and specifications:

NIST Handbook 44, 2007 Edition, NCWM Publication 14, 2007 Edition

FCC 47 CFR Ch. 1 Part 15 2007-09-20
Section 15.107 (a), limits same as IEC/CISPR 22:1997 (EN 55022:1998) Class B
Section 15.109 (a) Class B, and/or
Section 15.109 (g), i.e. IEC/CISPR 22:1997 (EN 55022:1998) Class B

2 System Description

The IT3000M is a general purpose weighing terminal for use in a variety of applications such as data logging, data capturing, parts counting and filling. Depending on the chosen scale interface (ADM or DUAL-ADM) and the selected operating mode, either one or two analog understructures with a total of up to 16 strain gauge loadcells with an impedance of 350 Ω each can be connected.

The scale interface module DWB permits the connection of digital force transucers with RS485 interface, whereas the IDN module enables the connection of digital Mettler-Toledo understructures with IDNet interface.

The operating modes Basic, Count and Online support the connection of 2 scale bases, whereas Truck, Truck/Online, Check and Fill are intended for 1 scale base only.

As required for a specific application, plug-on modules for 1 or 2 serial interfaces or alternatively 1 Ethernet and 1 serial interface and 1 module with 2 digital I/Os or 1 analog output can be added. The integrated clock module provides powerfail safe date and time function. The battery-backed RAM provides storage capacity for the scale error log and up to 120,000 records in a data archive.

Power supply through the built-in power supply unit is either for 110 - 240 VAC or 12 - 30 VDC. Cables of all external components are connected at screw terminals.

Weight and additional information is indicated on a back-lit 20-character LCD, height of characters 14mm. Operation and data entry is made via a sealed membrane keyboard with tactile feedback.

Operation, sequence and printout can be configured for a specific application. All entries required for the configuration can be made through the keyboard of the terminal. As an alternative, a comprehensive PC program for configuration and archiving is available.

Instead of operating the terminal locally via keyboard and display, full remote control is possible from a PC. In applications legal for trade data can also be stored in an approved data archive on the PC's harddisk.

2.1 Construction

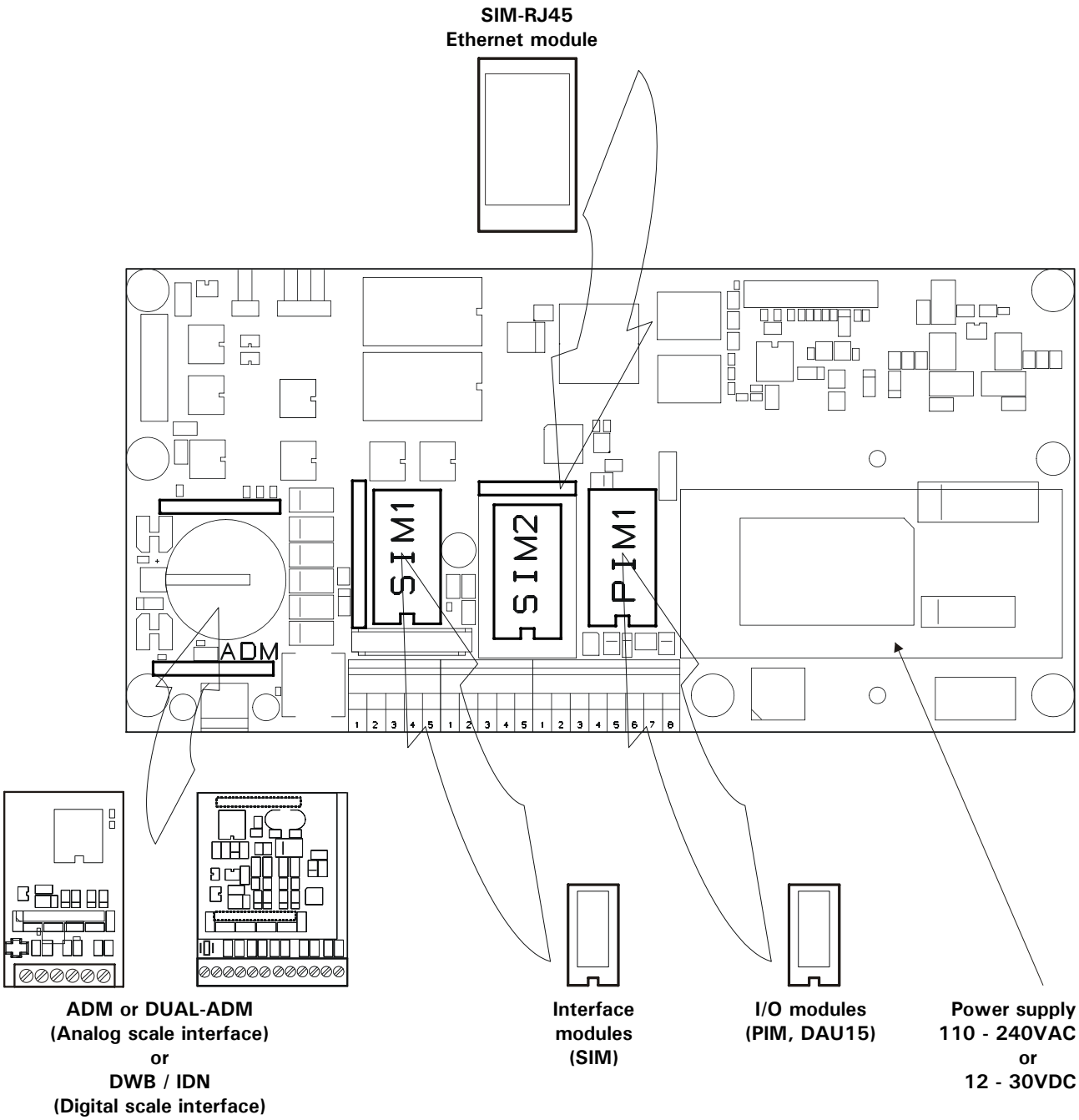
IT3000M is incorporated in a stainless steel housing for wall-mount or desk-top installation. As option, a panel-mount version is available. All cable connections are made at the rear of the housing through tight cable glands.

See section 'Dimensions' for details.

2.2 Main Module CPU3000-1

The CPU3000-1 module is the core of the IT3000M weighing terminal. It contains the microcontroller with data and program memory.

Layout of components on CPU3000-1 main module



3 Installation

3.1 Safety Advice

W A R N I N G
Disconnect all power to the instrument and/or unplug line cord prior to opening the housing! Failure to observe this precaution could result in bodily injury!

Notes:

- **Transport and storage of electronic components such as boards, EPROMs, etc. must only be made in suitable anti-static ESD bags or cases.**
- **Shielding measures for the connection of cables must absolutely be adhered to. Insufficient shielding may cause interference and could result in malfunction of the instrument.**

Compliance with the following safety instructions is mandatory for UL approved units:

CAUTION
For power supply of the IT3000M-DC use LPS and/or NEC class 2 power supply units only.

CAUTION
Use UL-approved cables only for connections to the weighing terminal.

- **Only suitable cables may be connected to the 24V power supply unit, complying with the specification below:**
  - **$U_N > 30V$;**
  - **suitable for the environmental conditions prevailing at site of installation (indoor / outdoor / temperature / humidity);**
  - **UL approval (e.g. category AVLV2, QPTZ or DUZX);**
  - **gauge 26 < AWG < 16;**
  - **diameter of cable 4mm < d < 8mm.**

3.2 Setup Of The Instrument

Ambient temperature for operating the unit may range from –10°C to +40°C, at a maximum of 95% relative humidity, without condensation. Exposure to direct sunshine should be avoided.

For wall-mount applications the terminal can be fixed at the wall first, the connection cables can be fitted later with the lid of the housing removed.

3.3 Opening Of The Housing

To open the housing a size 7mm wrench is required. Please make sure that cables running from the various modules to display and keyboard are not torn off or damaged when lid is removed.

3.4 Securing Unit For Wall-Mount Installation

Compliance with the following safety instructions is mandatory for UL approved units:

In order to comply with UL guidelines, the components must only be secured with the fixing materials described below. The positions of the fixing holes for the device are shown in the section 'Dimensions'.

Fixing to metal:

Type	Screw type [1])
A	M6 x 12
	Note [1]) represents min. length

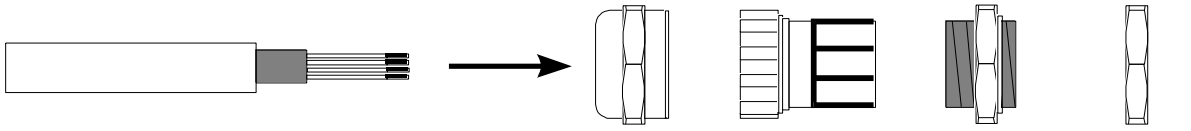
Fixing to reinforced concrete:

Type	Screw type [1])	Plug type (Nylon)
A	6 x 40 mm	8 mm, e.g. Fischer S8, type No.: 50108
	Note [1]) represents min. length	

Ensure that the wall or ceiling can hold four times the total weight of the device.

3.5 Connection Of Cables

All cables are led into the housing through cable glands. Required size of wrenches: PG9 → 17mm; PG11→ 20mm.



Cable connection through cable glands:

1. **Slide compression nut over cable jacket;**
2. **Slide plastic insert (retainer) over cable jacket until inner end is aligned with cut end of jacket;**
3. **Unravel shield, bend over retainer and push into retaining comb. Cut wires of shield to length of comb, avoid protruding wires;**
4. **Insert retainer with cable into bushing;**
5. **Screw compression nut onto bushing and use wrench to tighten securely.**

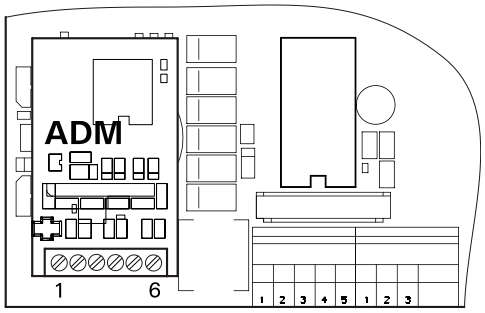
W A R N I N G
Cut cable ends as short as possible and make sure that they cannot touch any parts (mains cable, power supply) conducting mains voltage!
Use wire end ferrules with plastic collar on stranded cables and avoid protruding wires!

3.6 Connection Overview

3.6.1 ADM

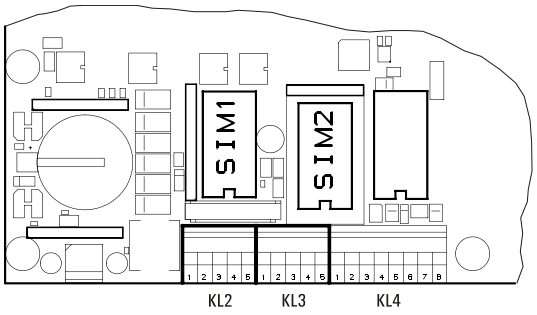
6-wire	
1	+ Excitation
2	– Excitation
3	+ Sense
4	– Sense
5	+ Signal
6	– Signal

4-wire	
1 / 3	+ Excitation
2 / 4	– Excitation
5	+ Signal
6	– Signal

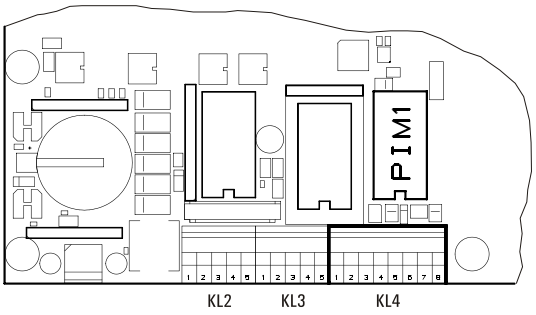


3.6.2 CPU

KL2 Serial interface 1 (SIM1) KL3 Serial interface 2 (SIM2)			
Terminal#	RS232	20mA	RS485 4-wire
1	TxD	TX_{IN}	Tx A (Tx+)
2	RTS	TX_{OUT}	Tx B (Tx–)
3	RxD	RX_{IN}	Rx A (Rx+)
4	CTS	RX_{OUT}	Rx B (Rx–)
5	Gnd	–	–



KL4: digital inputs and outputs 0 - 3 (PIM1)		
1	0V	
2	+10V	for external switches only!
3	IN0	depending on operating mode
4	IN1	depending on operating mode
5	IN–	for IN0 - IN1
6	OUT0	depending on operating mode
7	OUT1	depending on operating mode
8	OUT+	for OUT0 - OUT1



DAU15 in socket PIM1:		
I+	+ Current output 0/4 - 20mA	KL4.3
I–	– Current output 0/4 - 20mA	KL4.4
U+	+ Voltage output 0/2 - 10V	KL4.6
U–	– Voltage output 0/2 - 10V	KL4.7

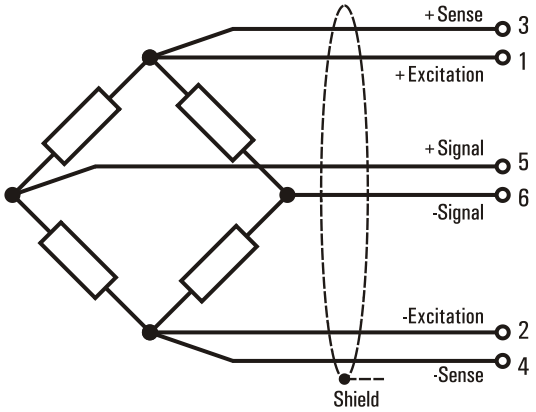
3.7 Connection Of Scales

3.7.1 Connection Of Analog Scale To ADM

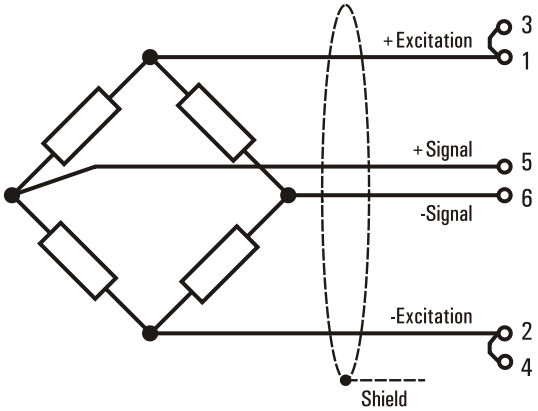
The ADM module provides connection for weighing platforms and loadcells as specified below.

- **Max. 16 strain gauge loadcells 350 Ω each**
- **Overall impedance 21 Ω ... 4500 Ω**
- **W&M approved resolution of 6000d at a max. preload of 80%, internal resolution 524,000d**
- **Smallest permissible input signal for approved applications: 0.33 µV / e**
- **Update rate 50-400 updates / second (selectable in Service Mode)**
- **Loadcell excitation: 5 V ±5% (gated power supply).**

Principal schematics of 6-wire and 4-wire strain gauge loadcell:



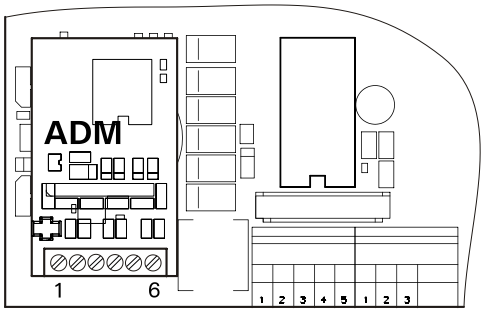
6-wire loadcell



4-wire loadcell

Connection of 6-wire analog loadcell(s) to ADM:

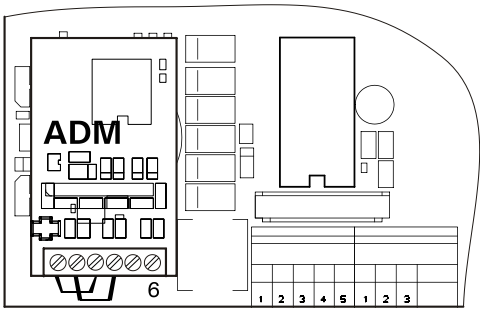
Terminal Assignment	
1	+ Excitation
2	– Excitation
3	+ Sense
4	– Sense
5	+ Signal
6	– Signal



Connection of 4-wire analog loadcell(s) to ADM:

To connect loadcells without sense lines (4-wire connection), two jump leads must be connected between terminal 1 and 3, and between terminal 2 and 4.

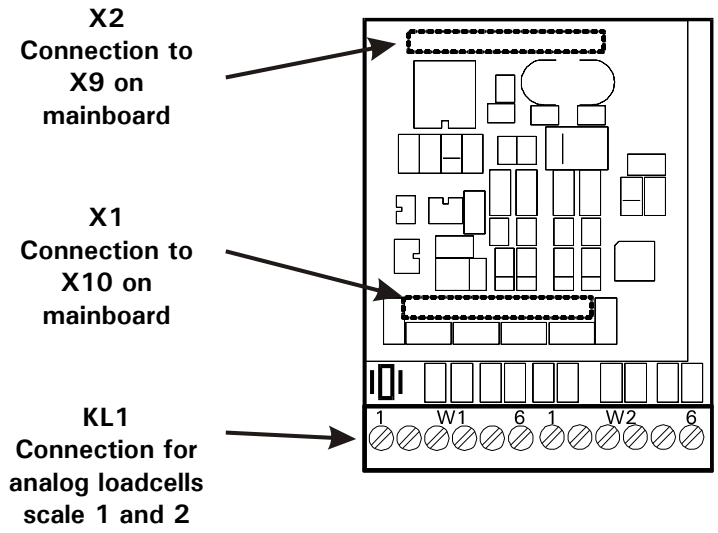
Terminal Assignment	
1 / 3	+ Excitation
2 / 4	– Excitation
5	+ Signal
6	– Signal



3.7.2 Connection Of 2 Scale Bases Via DUAL-ADM

Terminal assignment on DUAL-ADM module

Terminal KL1		Assignment
W1	1	W1 + Excitation
	2	W1 – Excitation
	3	W1 + Sense
	4	W1 – Sense
	5	W1 + Signal
	6	W1 – Signal
W2	1	W2 + Excitation
	2	W2 – Excitation
	3	W2 + Sense
	4	W2 – Sense
	5	W2 + Signal
	6	W2 – Signal



Connection of 4-wire loadcell:

To connect loadcells without sense lines (4-wire connection), two jump leads each must be connected at terminal strip KL1 between terminal 1 and 3 as well as 2 and 4 (scale 1 and 2).

For operation with two scales please note:

The DUAL-ADM module has one A/D converter which is either connected to scale 1 or scale 2 and which does not permit reading of the two scales in parallel (switching mode only). A summing mode is not possible. On switching from one scale to the other, new measuring values are determined for digital filtering and the motion detector, thus it takes approx. 1 sec after switching until a stable weight can be displayed.

The DUAL-ADM module provides hardware detection to tell the operating system that now two scales are connected. Only then the calibration routines for the second scale can be called up.

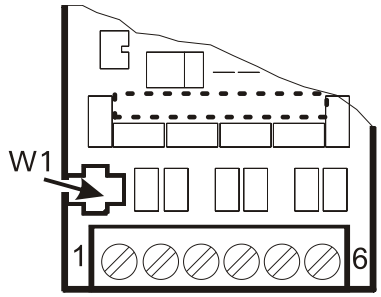
W A R N I N G
The weighing terminal may only be installed in non-hazardous (safe) area. Connection of Ex-i loadcells installed in hazardous area must be made via suitable zener barriers of type 10ZUB483!

For the installation of connection cables for analog weighing platforms please follow the recommendations listed below:

- **Only use suitable loadcell cable,**
  (e.g. SysTec order-No. 10KAB214, 3 x 2 x 0.75mm², shielded)
  Nominal voltage of cable ≥250V.
  Unsuitable loadcell cable may affect accuracy.
- **The shield of the loadcell cable must be connected all around the cable in the cable gland of the weighing terminal (see also chapter 'Installation' / 'Connection Of Cables'). If an extension of the loadcell cable is required use only metal junction boxes and cable glands. The shield on both sides must be connected in the same way as at the terminal. Loadcells and/or weighing platforms, junction boxes and the terminal must be included in the potential equalization of the components of a weighing system. Depending on the situation on site this may require the installation of a separate earth lead of appropriate diameter (e.g. 16mm²) in parallel to the loadcell cable.**
- **Distance between loadcell cables and power lines: ≥0.5m. Loadcell cables to be installed in grounded metal conduits, metal hoses or metal cable trays.**
- **Maximum length of connection cable between weighing platform and weighing terminal: 200m**
- **If tension load is applied to loadcells instead of compression load, connection for + Signal and – Signal must be transposed.**

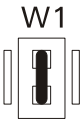
3.7.3 Sealing Of Calibration Parameters

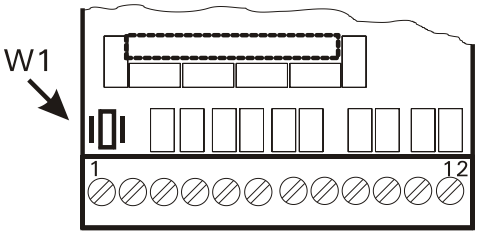
By means of the jumper W1 the calibration parameters stored in EEPROM can be protected against unauthorized modifications:



ADM

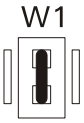
Calibration parameters protected



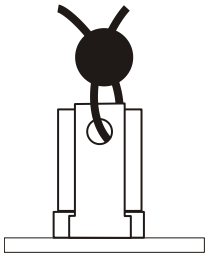


DUAL-ADM

Calibration parameters of both scales protected



If required for W&M approved and stamped systems, the position of the jumper W1 can be sealed with thread and lead seal:



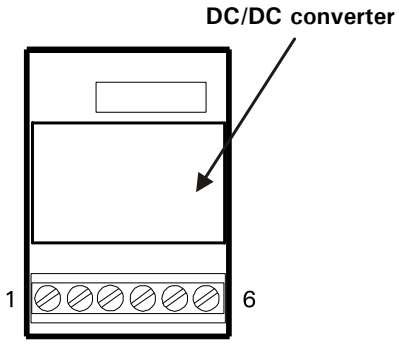
For a description of the calibration mode refer to:
ADM / DUAL-ADM / ADM8000-Exi Calibration Manual, order-No.: ST.2309.0688

3.7.4 Connection Of Digital Mettler-Toledo Scale Bases With IDNet Interface

The IDN module (IDNet interface module) permits the connection of Mettler-Toledo scale bases with IDNet interface.

The IDN module supplies a current of 150mA max. at 12VDV for the supply of the IDNet scale base.

IDN interface module



Terminal KL1
Interface for scale base

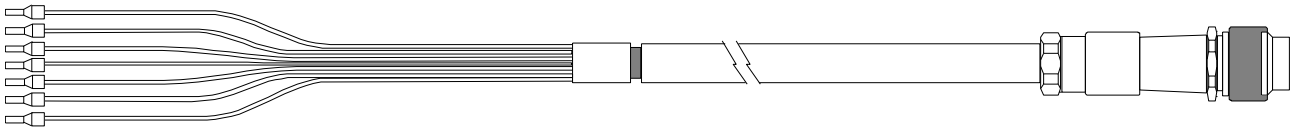
Terminal KL1	Signal	Function
1	TxD–	– transmit line 20 mA CL
2	TxD+	+ transmit line 20 mA CL
3	RxD–	– receive line 20 mA CL
4	RxD+	+ receive line 20 mA CL
5	0 V	0 V supply voltage
6	+12 V (150mA)	+12V supply voltage

IDNet scale bases with 12V supply voltage (e.g. TBrick) are connected with the IDNet interface cable 16KAB002.

For IDNet scale base with 12V and 32V supply voltage (e.g. K cell) the external power supply module IDNet-PSBox (10OPT124) is required. Connection is then made with the IDNet interface cable 16KAB004.

Standard cable for the connection of digital weighing platforms (approx. 0.3m):

IDNet connecting cable for Mettler-Toledo scale bases
Art.-No. 16KAB002 / 16KAB004 (ST.2300.0064)



Terminal Strip KL1	Color	Signal	Pin Assignment (12-pin Binder Connector)
1	yellow	TxD–	J
2	green	TxD+	A
3	white	RxD–	F
4	brown	RxD+	D
5	pink	0 V	H
6	gray	+12 V	C
	blue	+ 32V	B

Note:

When an IDNet scale base with 12V supply voltage is connected with the interface cable 16KAB002, the blue wire must be cut inside the housing directly at the cable gland.

The pink and the blue wire of cable 16KAB004 (for IDNet scale bases with 12V and 32V supply voltage) are fiited with crimp contacts suitable for connection to the IDNet-PSBox.

3.7.5 Interface For Digital Force Transducers with RS485 Interface (DWB)

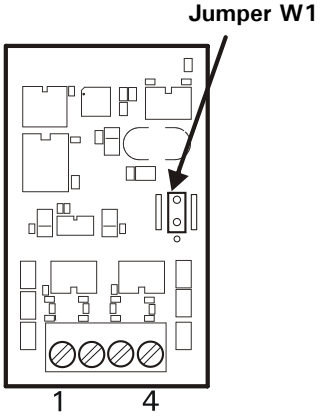
The DWB module (Digital Weighing Board) permits the connection of one digital force transducer via RS485 2-wire or 4-wire network. For the power supply of digital loadcells a suitable external power supply unit is required.

At present, scale bases and loadcells are supported as follows:

- **HBM series C16i loadcells, external PSU HBM (10ZUB460-HBM) required**
- **Flintec series RC3D loadcells, external PSU FLINTEC (10ZUB460-FLI) required**
- **Mettler-Toledo loadcells 0760/MTX, external PSU DigiTOL-Box (10OPT140) required.**

Calibration data are stored powerfail-safe in a serial EEPROM on the DWB module. By means of the jumper W1 these data can be protected against unauthorized access.

DWB interface module

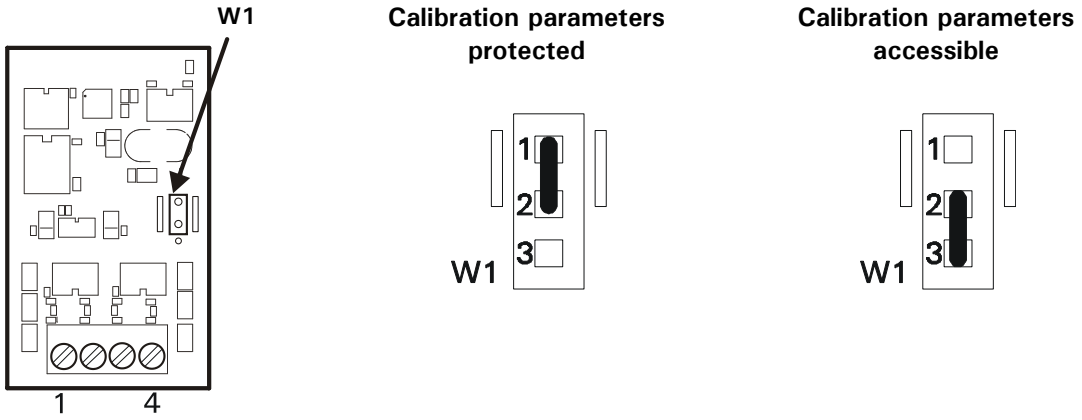


Terminal strip KL1 connection of digital scale base

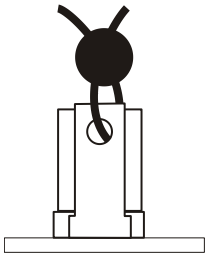
Terminal KL1	Signal RS485 4-wire	Signal RS485 2-wire	Assignment
1	Tx A (Tx+)	A (Tx+ / Rx+)	+ transmit line RS485
2	Tx B (Tx−)	B (Tx− / Rx−)	− transmit line RS485
3	Rx A (Rx+)	−	+ receive line RS485
4	Rx B (Rx−)	−	− receive line RS485

3.7.6 Sealing Of Calibration Parameters

means of the jumper W1 the calibration parameters stored in EEPROM can be protected against unauthorized modifications:



If required for W&M approved and stamped systems, the position of the jumper W1 can be sealed with thread and lead seal:



3.7.7 Connection Cables For Digital Force Transducers

Unsuitable cable may cause loss of data. For the installation of connection cables for digital weighing platforms please follow the recommendations listed below:

- **Only use suitable connecting cable (data cable), e.g. 6 x 0.25 mm² shielded, SysTec order-No. 10KAB216, or data cable supplied by the manufacturers of scale base.**
- **Nominal Voltage of cable ≥250V.**
- **Connect shield of cable at both sides, at cable gland of terminal and at scale base and/or extension cable. Install appropriate equipotential bonding if difference of potential is experienced.**
- **Distance between data cables and power lines: ≥0.5m. Data cables to be installed in grounded metal conduits, metal hoses or metal cable trays.**
- **Maximum length of connection cable between weighing platform and terminal: 15m.**

3.8 Connection Of SIM-RJ45 Module

The SIM-RJ45 module is plugged into the SIM-RJ45 socket. It has an RJ45 connector for connection to local Ethernet networks. When a SIM-RJ45 module is installed, the SIM2 socket is no longer available.

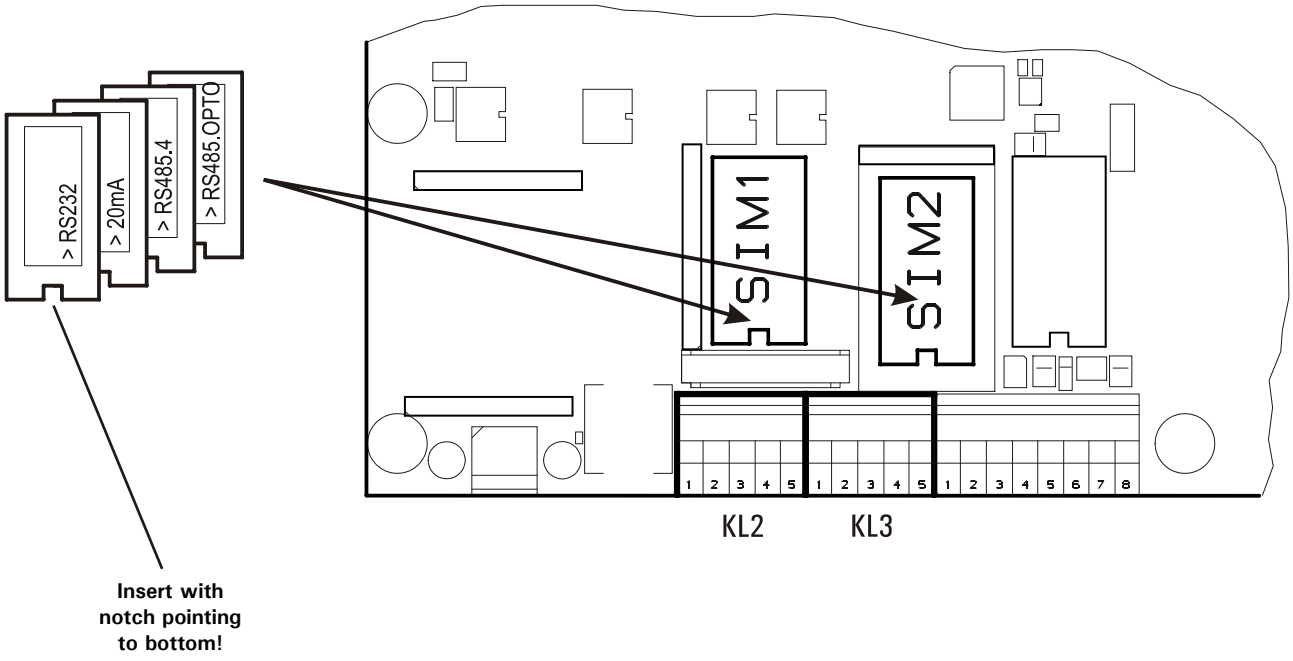
3.9 Connection Of Serial Interfaces (SIM)

The following plug-on modules for serial interfaces and an incremental sensor can be inserted in the SIM sockets:

- **'SIM RS232' (RS232 interface)**
- **'SIM 20mA' (20mA current loop interface)**
- **'SIM RS485.4' (RS485 4-wire interface)**
- **'SIM RS485.OPTO' (RS485 4-wire optoisolated interface)**

Please note: When a 20 mA CL interface is used, receiver and transmitter of the weighing terminal are always passive, i.e. supply voltage for the current loops must be provided by the connected peripheral device.

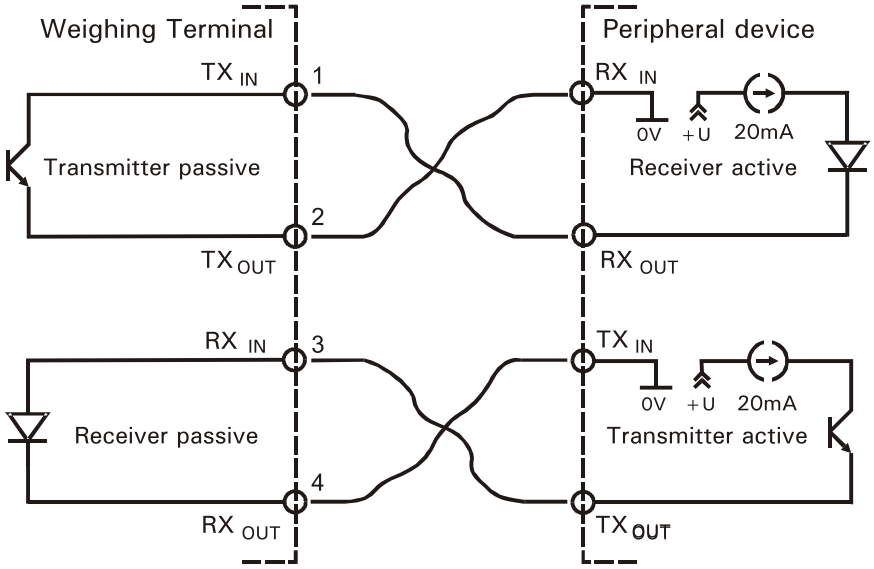
Connection of serial interface on the main module:



Terminal assignment SIM:

Serial interface 1 (COM1): KL1 Serial interface 2 (COM2): KL2			
Terminal#	**RS232**	**20mA**	**RS485 4-wire RS485-opto**
1	**TxD**	**TX_{IN}**	**Tx A (Tx+)**
2	**RTS (COM1 only)**	**TX_{OUT}**	**Tx B (Tx−)**
3	**RxD**	**RX_{IN}**	**Rx A (Rx+)**
4	**CTS (COM1 only)**	**RX_{OUT}**	**Rx B (Rx−)**
5	**Gnd**	**—**	**—**

Principal circuit diagram of the 20mA current loop interface:



For the installation of connection cables for serial interfaces please follow the recommendations listed below:

- **Install data cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could interrupt data transmission and lead to loss of data.**
- **For maximum suppression of interference, shield should be grounded on both sides.**
- **If fluctuation of the earth potential is experienced, this can cause an equalization current flowing over the shield. In this case a separate earth lead of appropriate diameter for potential equalization is required.**
- **Non-factory made cables must comply with the following specification:**

Triple twisted pair plus shield, e.g. LIYCY 3 x 2 x 0.14mm² or LIYCY 3 x 2 x 0.25mm², shield grounded on both sides.

Resistance	**≤ 125 Ω/km**
Gauge	**≥0.14 mm² up to 200m, ≥0.25 mm² up to 1200m**
Capacitance	**≤ 130 nF/km**
Length RS232	**max. 15m**
Length RS485	**max. 1200m**
Impedance RS485	**approx. 150 Ω**
Nominal voltage	**≥ 250V**

For RS485 connections please note:

Terminal assignment: Some manufacturers of components with RS485 interface do not refer to the terminals TX+ and RX+ as 'A', but 'B' instead (correspondingly, the terminals TX– and RX– are not referred to as 'B', but 'A').

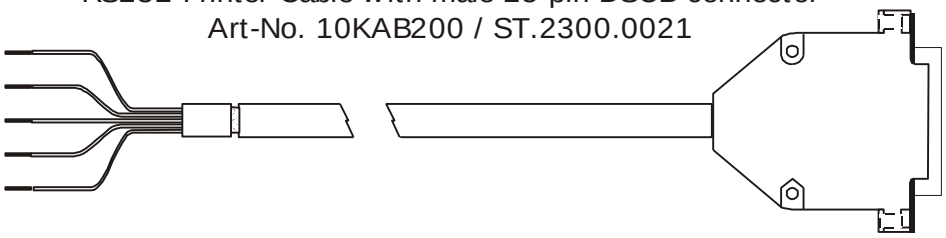
Cables: Use only twisted pair cables with a characteristic impedance of approx. 150 Ω.

Termination resistors: In order to prevent reflection (baud rate 19200 Baud or higher, and/or cable longer than 20 m) it is recommended to install termination resistors R_{Term} = 150 Ω on both ends of the cable.

Pull-up / pull-down resistors: When termination resistors are used, also pull-up and pull-down resistors must be installed at the master (see also following schematic).

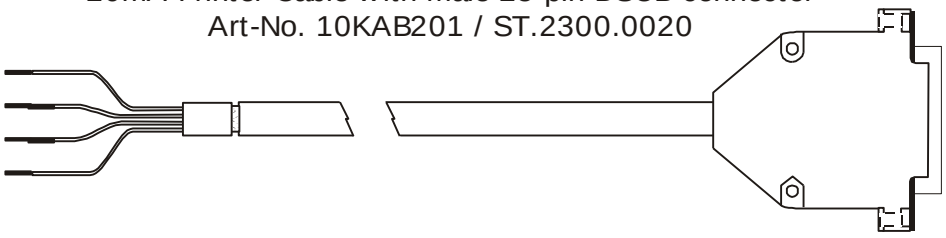
3.9.1 Standard Cables For Serial Interface

RS232 Printer Cable with male 25-pin DSUB-connector
Art-No. 10KAB200 / ST.2300.0021



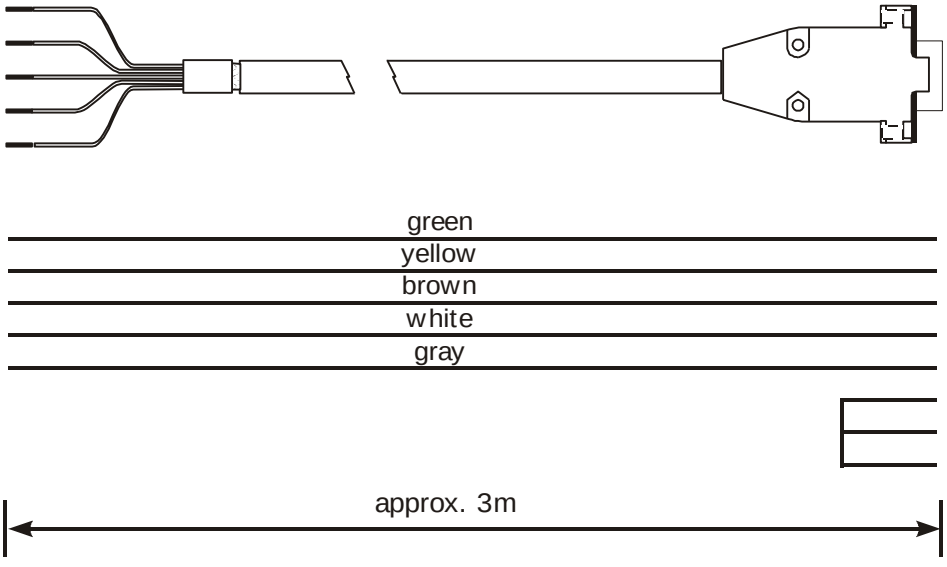
Terminal			Printer	
TxD	1	green	3	RxD
RTS	2	yellow	5	CTS
RxD	3	brown	2	TxD
CTS	4	white	20	DTR
Gnd	5	gray	7	Gnd

20mA Printer Cable with male 25-pin DSUB-connector
Art-No. 10KAB201 / ST.2300.0020



Terminal			Printer	
TX_{IN}	1	green	23	RX_{OUT}
TX_{OUT}	2	yellow	25	RX_{IN}
RX_{IN}	3	brown	24	TX_{OUT}
RX_{OUT}	4	white	17	TX_{IN}

RS232 Data Cable with female 9-pin DSUB-connector
Art-No. 10KAB202 / ST.2300.0019



Terminal			PC	
TxD	1	green	2	RxD
RTS	2	yellow	8	CTS
RxD	3	brown	3	TxD
CTS	4	white	7	RTS
Gnd	5	gray	5	Gnd
			1	
			4	
			6	

approx. 3m

3.10 Ethernet Connection

Connection to a local 10/100MBit Ethernet network is made via a connecting cable with RJ45 connector (internal connection at X2 on main board):

- **10KAB405, Ethernet cable 5m with cable gland and RJ45 connector;**
- **10KAB410, Ethernet cable 10m with cable gland and RJ45 connector;**
- **10KAB420 + 10KAB421, Ethernet cable with cable gland and RJ45 connector, customized cable length.**

Note:

- **When the external Ethernet connection is used, the WLAN module WLX cannot be connected at X3.**
- **Max. permissible cable length without repeater (hub/switch) is 80m**

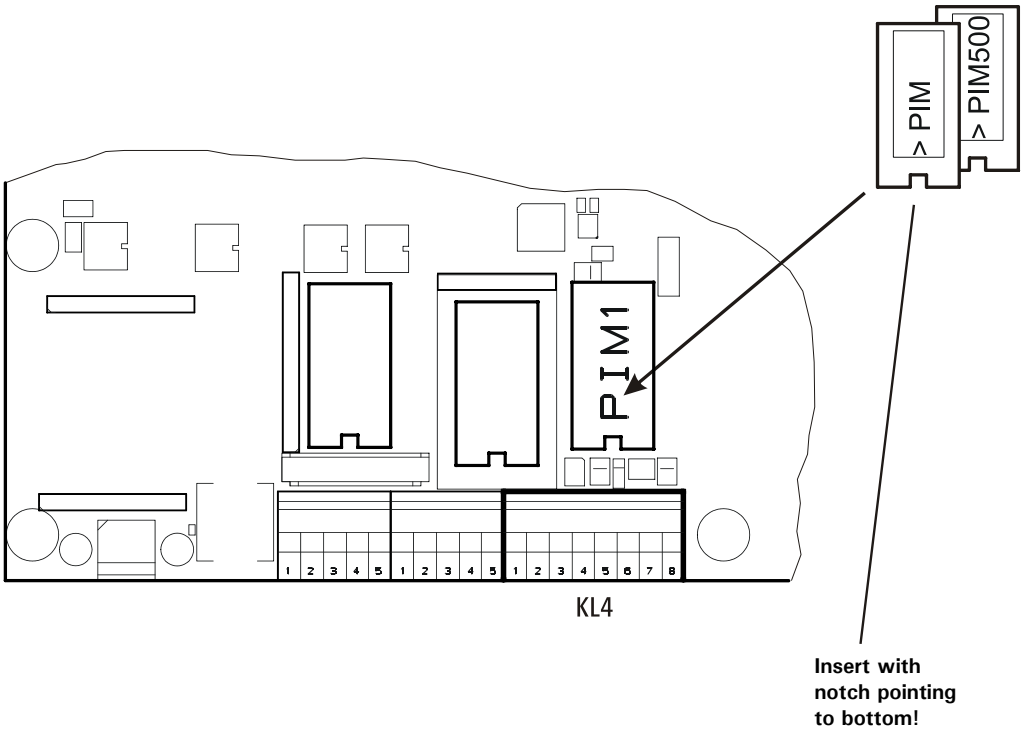
3.11 Connection Of Digital I/Os PIM/PIM500

The digital input/outputs on the mainboard can be activated by inserting plug-on modules (PIM/PIM500). Each module provides drivers for two optoisolated inputs and two optoisolated outputs.

PIM: Rating of outputs: 12-24VDC; 100mA max.
Current consumption of inputs: 7mA max. @ 12-24VDC.

PIM500: Rating of outputs: 12-24VDC; 500mA max., short-circuit proof.
Current consumption of inputs: 7mA max. @ 12-24VDC.

Position and assignment of digital inputs/outputs on mainboard:



KL4: digital inputs and outputs 0 - 1		
1	0V	
2	+ 10V	for external switches only!
3	IN0	depending on operating mode
4	IN1	depending on operating mode
5	IN–	for IN0 - IN1, PIM500:for IN0 - IN1 and OUT0 - OUT1
6	OUT0	depending on operating mode
7	OUT1	depending on operating mode
8	OUT +	for OUT0 - OUT1

Note: The internal 10 VDC supply (terminal row KL4, terminal #2) may be used to connect switches (max. 15mA) and push buttons to the digital inputs. If an interface board to connect digital force transducers (IDN, DWM) is installed, this auxiliary voltage is not available. External devices connected to the digital *outputs* must always be supplied from an external 24 VDC power supply.

For the installation of connection signal cables please note:

Install I/O cables to prevent capacitive or inductive interference from other cables, machines and/or electrical devices that could affect input/output signals and lead to malfunction and/or dangerous operational conditions.

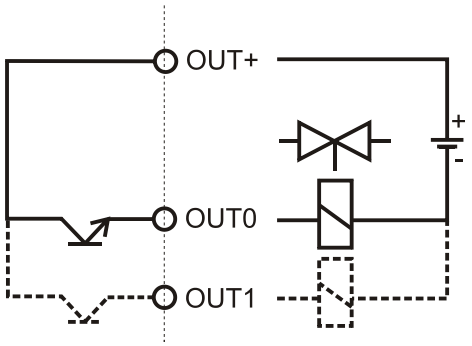
Cables must comply with the following specification:

- **shielded multicore cables, shield connected to ground on both sides**
- **flexible wires with wire end ferrules and plastic collar**
- **Resistance ≤125 Ω/km**
  Gauge 0.2 mm² to 0.5 mm² max.
  Capacitance ≤130 nF/km
  Length max. 15 m
  Nominal voltage ≥250 V

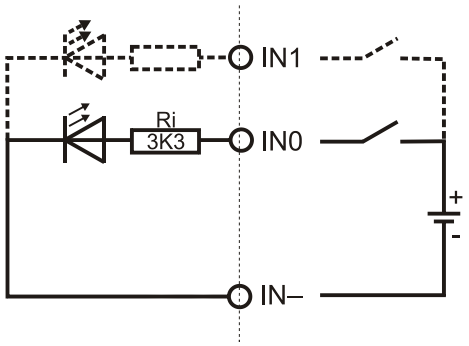
Note:

- **For maximum suppression of interference, shield should be grounded on both sides.**
- **If fluctuation of the earth potential is experienced, this can cause an equalization current flowing over the shield. In this case a separate earth lead of appropriate diameter for potential equalization is required.**
- **The digital outputs on the mainboard use one common connection OUT+, the digital inputs use the common connection IN–.**

Principal schematics PIM:

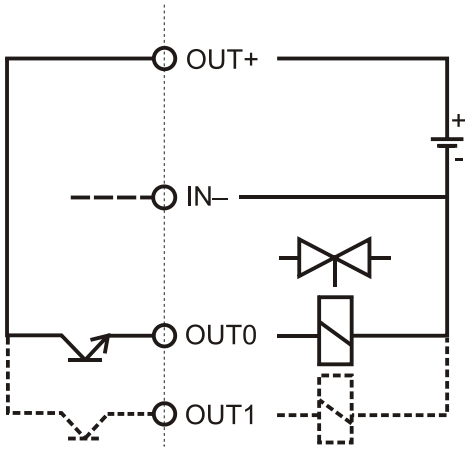


Digital output

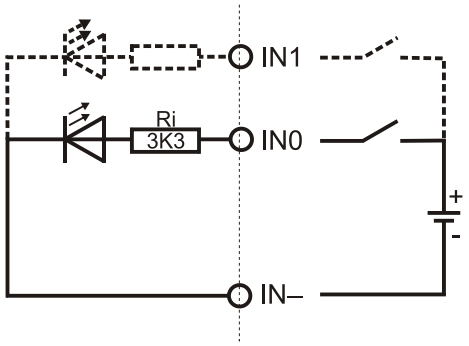


Digital input

Principal schematics PIM500:



Digital output

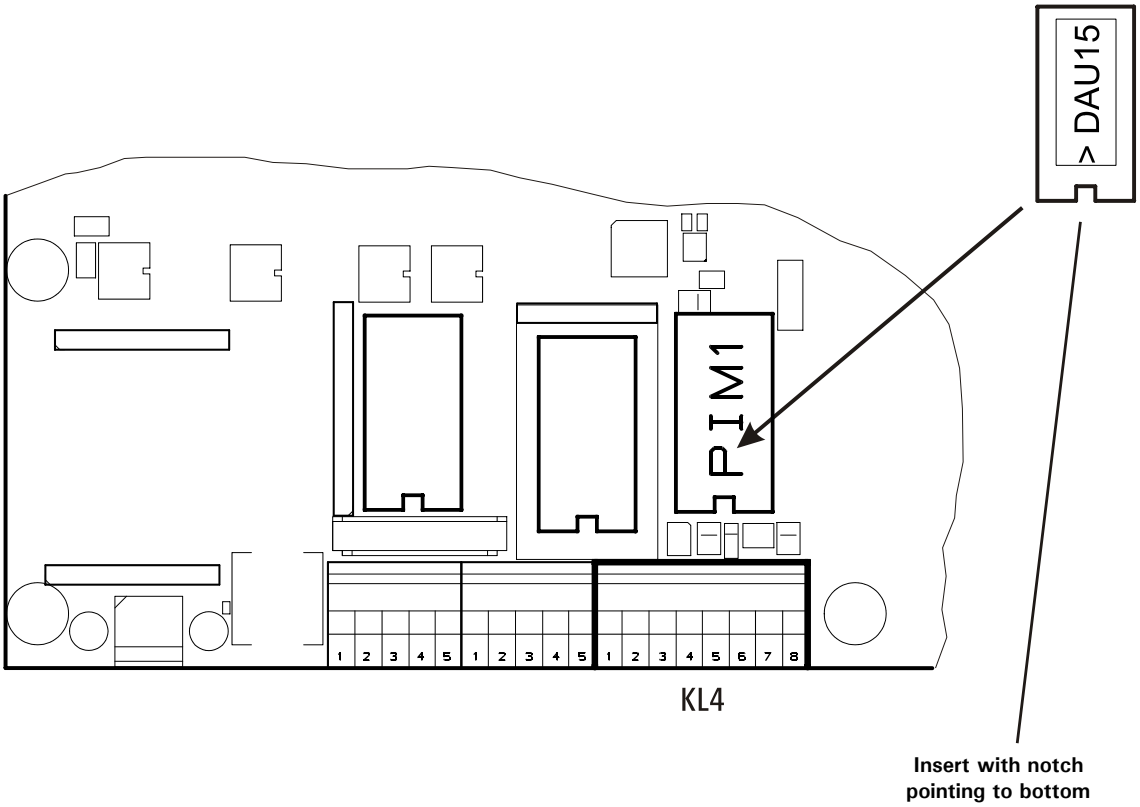


Digital input

3.12 Connection Of 15-Bit Analog Output DAU15

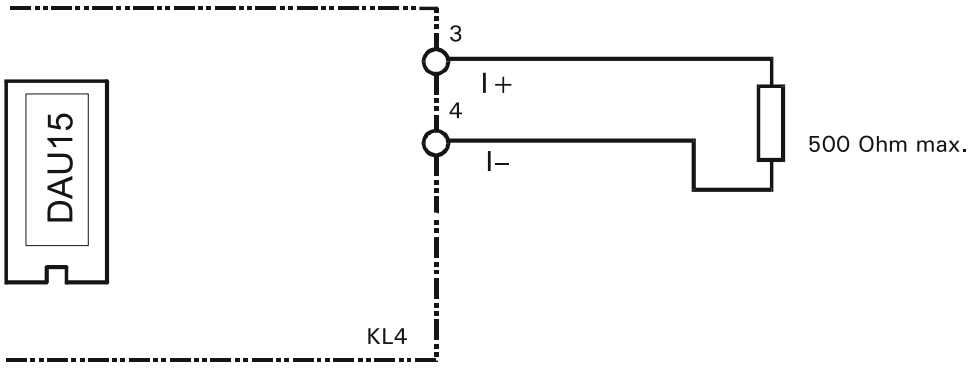
For the output of gross or net weight as analog 15-bit signal a plug-on module (DAU15) can be inserted in the socket PIM1. The output signal has a resolution of 15 bit (32768 steps). The module can be configured in group 4 'Configuration Of DAU15 Analog Output' of the Service Mode to 0/2 - 10V or 0/4 - 20mA. The output of the DAU15 module is active and potential free.

Inserting the DAU15 into PIM socket of the mainboard



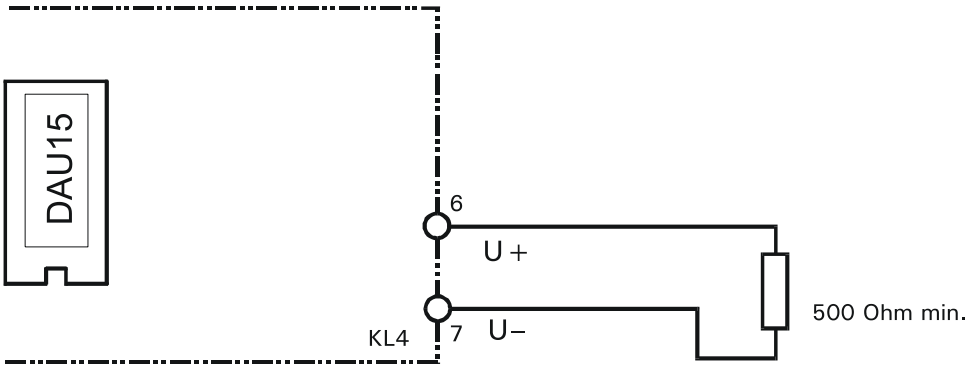
DAU15 in socket PIM1:		
I+	+ Current output 0/4 - 20mA	KL4.3
I–	– Current output 0/4 - 20mA	KL4.4
U+	+ Voltage output 0/2 - 10V	KL4.6
U–	– Voltage output 0/2 - 10V	KL4.7

Example for current output 0/4 - 20 mA (DAU15 in socket PIM1):



The impedance of the connected load must not exceed 500 Ohm.

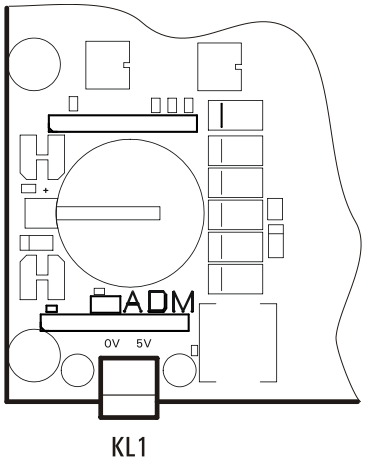
Example for voltage output 0/2 - 10 V (DAU15 in socket PIM2):



The impedance of the connected load must be equal or greater than 500 Ohm.

3.13 Auxiliary Power Supply For Peripheral Devices

Terminal KL1 provides a 5VDC power supply for peripheral devices.



Assignment terminal KL1

Marking	Voltage	Max. output current depending on type of installed scale interface	
VCC	5 VDC	– ADM with up to 16 analog 350Ω loadcells: – ADM with up to 8 analog 350Ω loadcells: – DWB with digital loadcells: – IDN with Mettler-Toledo IDNet scale base:	100 mA 200 mA 200 mA 0 mA
GND	Ground	– none	200 mA

Only peripheral devices with CE marking may be connected. In particular, all applicable EMC regulations must be complied with. Only shielded cables may be used. The shield must be connected inside the cable gland. When potential difference is experienced, potential equalization must be installed, cross section of bonding conductor: min. 4 mm².

3.14 Mains Connection

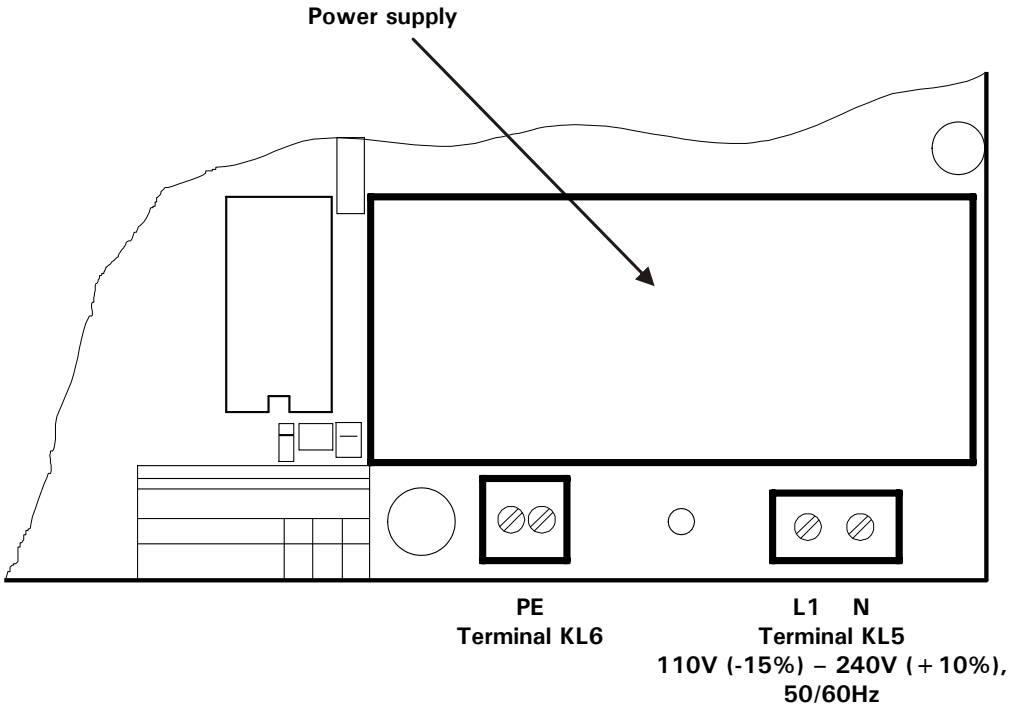
3.14.1 Power Supply 93 – 264 VAC

Before connecting the instrument to power please note:

- **Input voltage of the instrument must comply with local mains supply.**
  Factory setting: 93 - 264 V; 47/63 Hz, line cord with safety plug firmly connected.
- **Install mains supply for the instrument separate from supply for machines and equipment generating noise and/or interference (motors, relays, heatings, etc.). Even short spikes and/or drop-outs may affect the correct function of the instrument and result in defects. If problems of that nature are encountered, the installation of a voltage stabilizer or an uninterruptable power supply unit (UPS) may help to overcome the difficulties.**
- **Connection to the mains supply is made via the factory installed line cord with safety plug (length of cable 2.5m). Make sure that wall outlet is correctly grounded.**
- **If applicable, the unit can be included in the potential equalization system of the installation. To that effect a threaded bolt is provided at the rear of the housing.**
- **If the line cord with connector is used as the means to separate the instrument from the mains, the wall outlet must be installed close to the instrument and must be easily accessible! If a permanently connected mains cable is used, an easily accessible separator must be included in the supply circuit!**
- **The auto sensing switching mode power supply unit operates on an input voltage ranging from 93 -264VAC / 47 - 63Hz.**

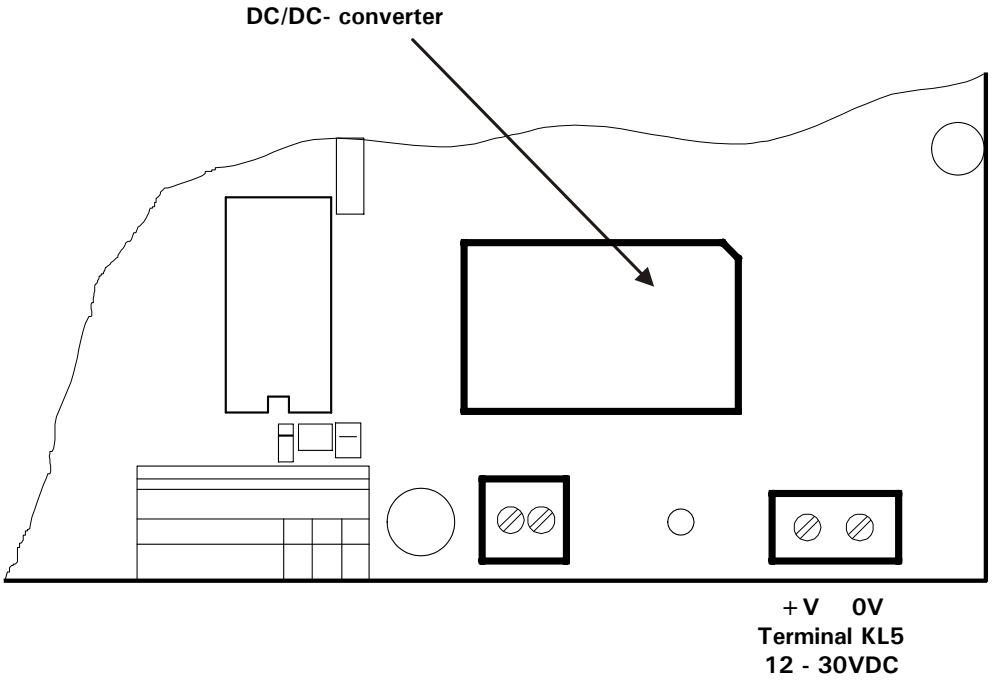
W A R N I N G
Parts of the power supply unit -in particular the heat sinks- are directly connected to dangerously high voltages! A defective power supply unit cannot be repaired it can only be replaced. Disconnect all power to the instrument before servicing!

Position of connectors for input and output voltages



3.14.2 Power Supply 12 – 30 VDC (PDU)

Alternatively, the weighing terminal can be fitted with a DC power supply with an input voltage ranging from 12VDC (–15%) to 30 VDC (+10%). A diode serves as protection against polarity reversal.



3.14.3 Power Supply 12 - 30 VDC (NTA)

A further option for the power supply of the weighing terminal is the use of external lead batteries. The permissible range of the input voltage for the NTA switch mode power supply unit is 12 VDC to 30 VDC.

The unit is switched on by pressing the Enter-key once, to switch it off the F7-key must be pressed.

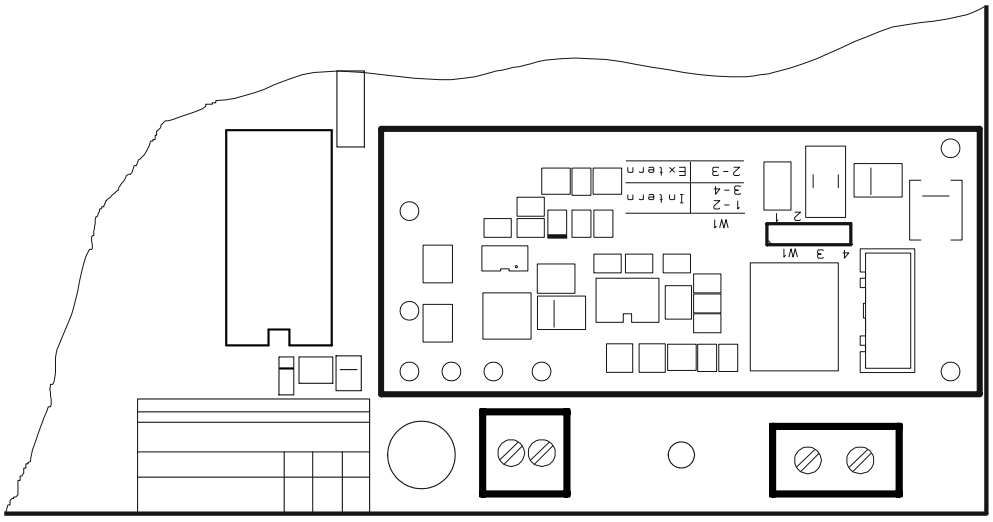
Operating time depends on several factors, such as ambient temperature, number of charging cycles and hardware configuration of weighing terminal.

Note: Battery low is indicated with a flashing battery symbol at the right-hand side of the display, reminding the operator that the battery needs recharging.

When the battery has reached its min. capacity, the terminal is switched off.

When it is switched on again, the display shows 'Low Battery' for approx. two minutes before it is automatically switched off again to prevent damages to the battery.

Operation with external battery



+V 0V
KL5
12-30VDC

	Jumper setting W1	Range of input voltage
IT3000M BATT	External (2 - 3)	12V – 30V

For the IT3000M the jumper setting 1 - 2 and 3 - 4 is without function.

When IT3000M-BATT is supplied from an external battery, the type of battery must be selected under: \Service\General\Power supply'.

This choice effects the automatic switch-off function of the weighing terminal:

		Battery low symbol below approx.	Auto switch-off below approx.
24Pb	24 V lead battery	23 V	22 V
12Pb	12 V lead battery	11.5 V	11 V
Line	Mains supply	10 V	9 V

Battery low is indicated with a flashing battery symbol at the right-hand side of the display, reminding the operator that the battery needs recharging.

To prevent damages to the battery due to deep discharge and the supply voltage of the IT3000M-BATT falling below its min. operating voltage, the terminal is switched off automatically when the battery voltage drops below the min. voltage. Prior to automatic switch-off the message 'Low Battery' is shown for approx. two minutes.

4 Service Mode

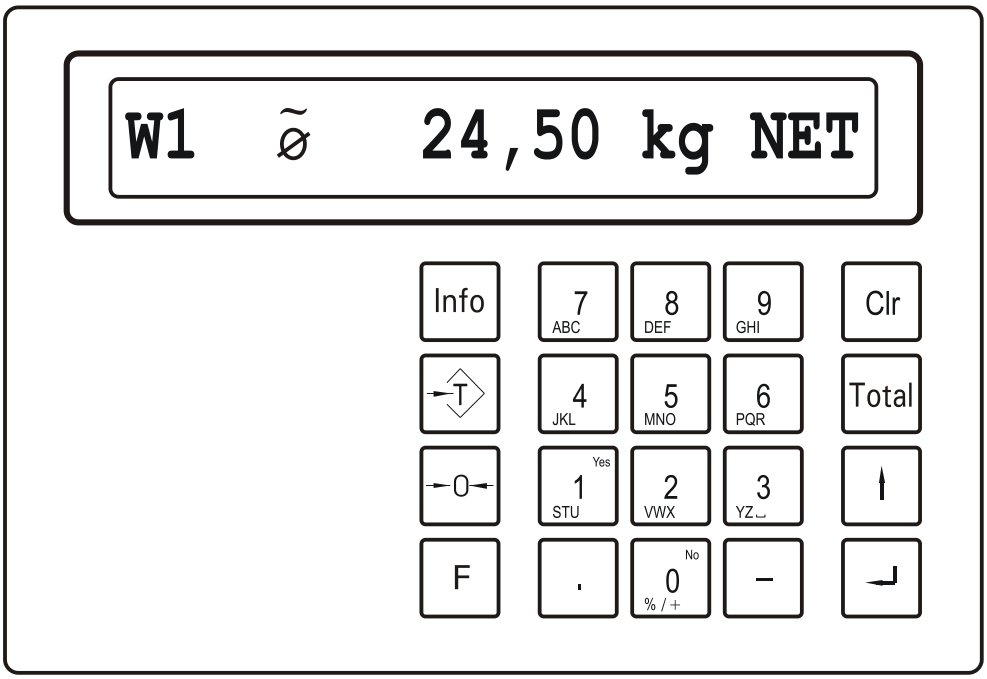
4.1 General

The Service Mode is a program for configuration, calibration and hardware test of the IT3000M weighing terminal. In the configuration the operating sequence and the print format are defined. The following sections give an introduction on how to operate the terminal via keyboard and display and describe the individual functions of the Service Mode.

Notes:

- **IT3000M and its associated equipment must be installed, adjusted and maintained by qualified personnel only!**
- **Before accessing the Service Mode all peripheral devices must be installed and configured!**
- **Access to the Service Mode is protected by the Service Password (see also last page of this manual).**
- **Inappropriate changes of Service Mode settings may lead to malfunction and errors in the operating sequence!**

4.2 Display And Keyboard



Display line:		**Gross or net weight or operator prompt and entry**
	⌀	**Symbol: Scale in gross zero range (± 0.2d)**
	~	**Symbol: Scale in motion**
Info and scale keys:	**Info**	**Scrolling forward, call up Service Mode in the initial step**
	→T←	**Taring (Autotare), if scale is tared: clear tare**
	→0←	**Set gross weight to zero**
Function keys:	**F1 – F8**	**Press F-key and numeric key (1 - 8) simultaneously to access function defined in application program (see below);**
	F1 / F2	**Switching scale 1 <-> scale 2 when two scales are installed (in the steps defined in the application program);**
	F0	**Switch weight display to tenfold resolution (in the basic step of the sequence), display falls back to normal mode after approx. 5 sec.**
	F–	**Activale alphanumeric entries**
	F.	**Activate numeric entries**
Special keys	**Clr**	**Numeric entry: press key once → clear entry** **Alphanumeric entry: short key stroke → clear last character (can be repeated several times to clear more than one character); hold key down for approx. 1 sec → clear the whole entry**
	↑	**Return to previous program step**
	↵	**Confirm entry, continue with next program step**
	Total	**Display / print totals (if defined in the operating sequence and the printout)**
Numeric keypad:		**Entry of numeric data, confirmation 'Yes' (=1) - 'No' (=0) and entry of alpha characters via multiple key assignment**

4.2.1 Alphanumeric Entries

[F] and [–] **Activate alphanumeric entries**

In the steps of the application program where alphanumeric entries are permitted, pressing the key briefly several times shows the assignments of the key one after the other.

Example:

Key pressed:	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	
Display:	**5**	**M**	**N**	**O**	**m**	**n**	**o**	**5**	**etc.**

To enter the letter 'n' the key 5 must be pressed six times until 'n' appears on the display. If the entry is paused for longer than 0.5 sec, the cursor moves on to the next character. If any other key is pressed, entry continues in the position of the next character immediately.

[F] and [.] **Activate numeric entries**

4.2.2 Deleting Of Characters

An incorrect entry can either be corrected by deleting the last character (short key stroke on Clr-key) or by clearing the complete entry (Clr-key pressed for longer than 0.5 sec). By pressing the Clr-key repeatedly, it is possible to delete several characters one after the other.

4.2.3 Operator Prompting

The following sections describe the operating sequence of the weighing terminal with operator prompts and the requested entries.

The contents of the terminal display is shown in a frame on the left hand side. Next to the display the possible operator entries are listed, on the right hand side comments and explanations are shown.

Password ????	**Entry of 4-character password**
↑	**Return to normal operation**

Prompts or entries that apply only under certain conditions are shown in an extra frame. The condition is shown in bold face in the upper left hand corner of the frame.

PC not ready:

PC Not Ready !	**Error message: PC is not ready for data transmission**

This message is only displayed when an error occurs.

↵ -key (Enter) and ↑-key

In all program steps, unless otherwise specified, the ↵ -key (Enter) leads to the next step. Pressing the ↑ -key leads to the previous step.

Confirmation with Yes (1) or No (0):

A prompt, e.g. 'Save parameters? Y' can be answered by pressing 1 and the ↵ -key to accept the proposed action or by pressing 0 and the ↵ -key to reject the proposal. By entering 0 the parameters are not saved.

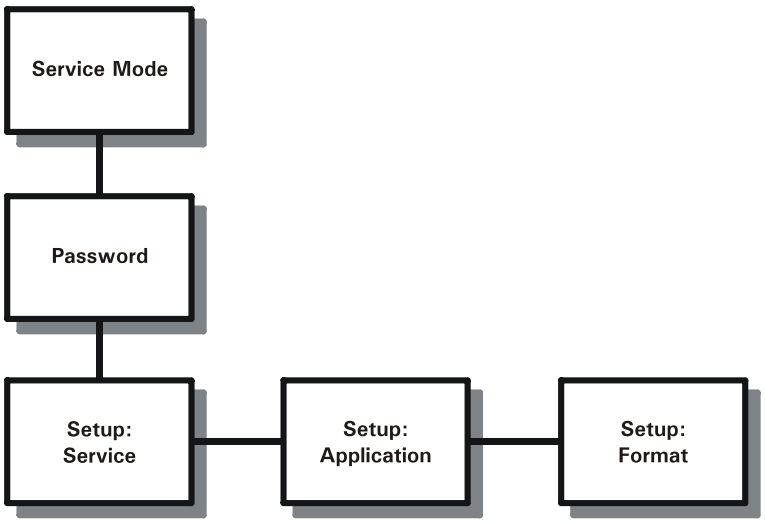
4.3 Power Up

After powering up the terminal, the messages with display of program version and date and time are displayed. By pressing the Info-key while the power up messages are displayed, the Service Mode is called up. After that the program proceeds to the initial step.

IT3000M ..		**Power up sequence, approx. 12 seconds**
IT3000M 9.99 999999		**Number and date of version**
	Info	**Call up Service Mode**
03.09.01 10:41		**Date and time**
	Info	**Call up Service Mode**
Basic		**Selected operating mode**
	Info	**Call up Service Mode**

Display of deviation from calbrated zero, if enabled in Service Mode:

W1 0-Cal. 0.00		**Show difference between actual and calibrated zero with tenfold resolution, display for approx. 1.5 sec**
	Info	**Call up Service Mode**

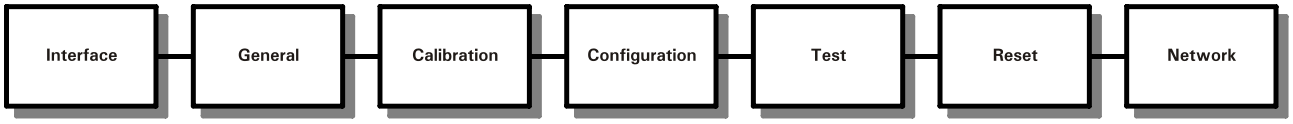


Service Mode:

Service Mode		**Display for approx. 1.5 sec.**
Password ????		**Entry of 4-character Service Password**
	↑	**Return to normal operation**
Setup: Service	**Info**	**Scrolling:**
	↵	**Service settings**

Setup: Application	Info ↵	**Scrolling:** **Enter setup parameters (language, format of date, basic sequence, field 33 - 34);** **(see chapter 'Entry Of Parameters')**
Setup: Format	Info ↵	**Scrolling:** **Configure operating sequence and printout;** **(see chapter 'Configuration Of Data Entry And Print Formats')**

4.4 Setup: Service (Service Settings)



Select group:

< >	**Use arrow-keys left/right to scroll through groups.**
↵	**Choose displayed group.**
↑	**Return to normal operation**

Service: Interface	**Configure interfaces;** **(see chapter 'Interface Configuration')**
Service: General	**Enter setup parameters (language, format of date, etc.); (see chapter 'Entry Of Parameters')**
Service: Calibration	**Calibrate scale;** **(see chapter 'Calbration Mode')**
Service: Config.	**Configure scale, digital I/Os, analog outputs** **(see chapter 'Configuration')**
Service: Test	**Test hardware;** **(see chapter 'Hardware Test')**
Service: Reset	**Load factory settings;** **(see chapter 'Reset')**
Service: Network	**Make network settings;** **Note: This menu is only available when network connection is installed.**

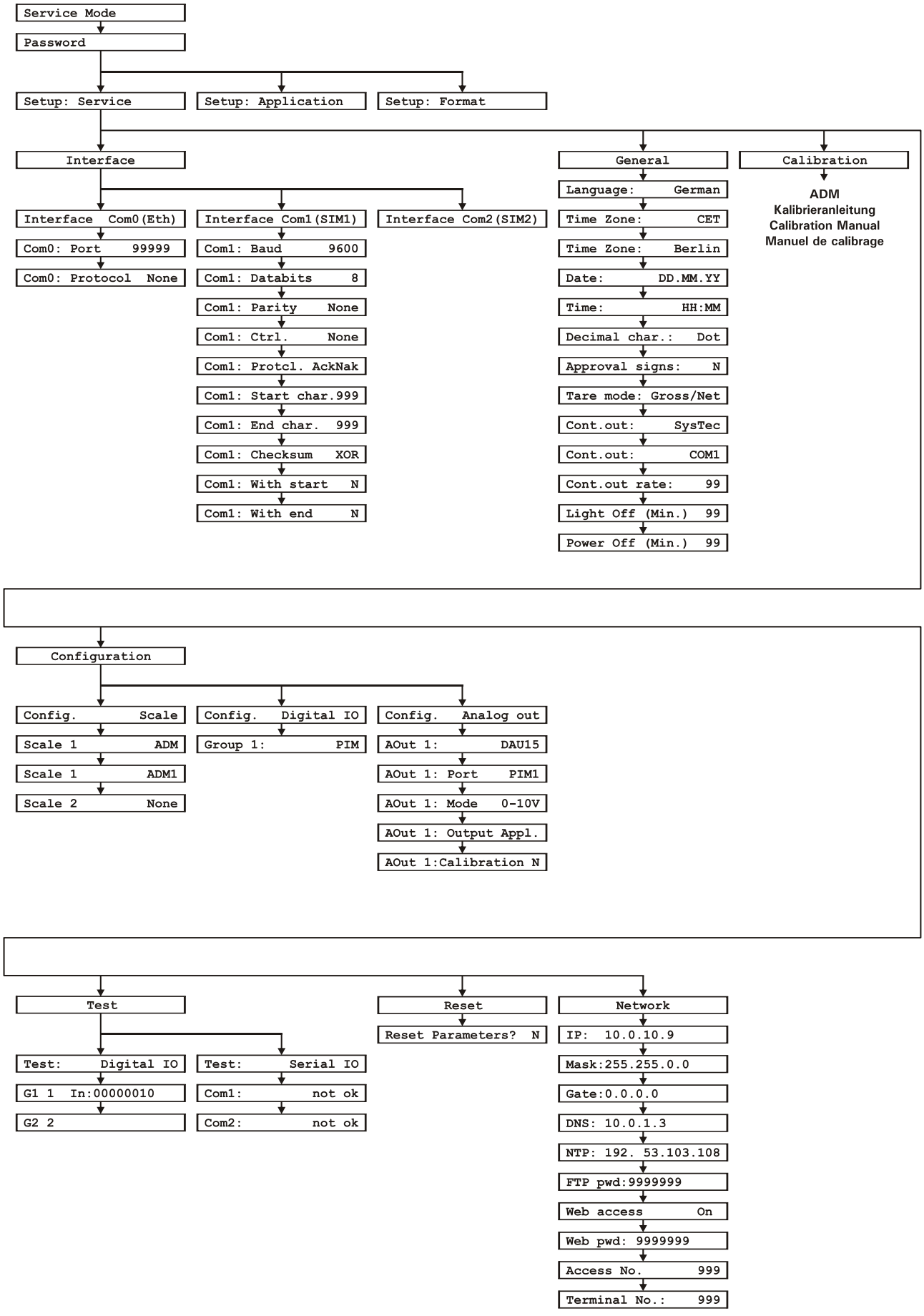
When the Service Mode is exited the entered or changed parameters are stored.

Saving...	**Exit Service Mode and store changes, return to normal operation**

CAUTION

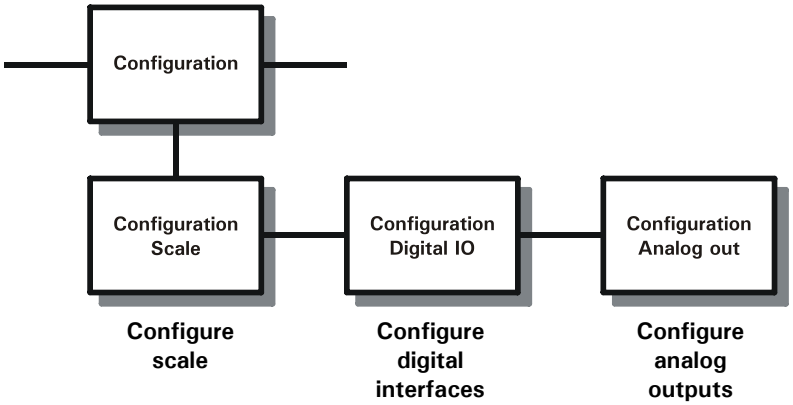
- **Under no circumstances switch off power while 'Saving...' is displayed, because that will inevitably destroy the contents of the Flash-EPROM and thus the program.**

4.5 Overview Setup:Service



5 Configuration

Choose group 'Config.' from 'Setup: Service' menu.



5.1 Set Up Scale Interfaces

Config. Scale		**Set Up Scale**
	↵	
Scale 1 ADM	**Info**	**Select scale driver for first scale:**

ADM	**Analog scale base**	
DWU	**Mettler-Toledo DigiTOL® loadcells connected to external DWU-Box**	
SBI	**MC1 compatible protocol (SBI)**	**[1])**
IDNet	**Mettler IDNet protocol**	**[2])**
Flintec	**Flintec protocol**	
MT-SICS	**Mettler-Toledo protocol**	
Dual-ADM	**2 analog scale bases**	
KERN	**KERN protocol**	**[3])**
HBM	**HBM protocol**	
None	**Disable scale**	

[1]) Parameters of the Sartorius scale must be set to:
MC1 protocol (SBI), 7 bit, odd parity, 1200 baud, RTS/CTS, streaming mode, 16-character data string.

[2]) Intended for Mettler-Toledo scale bases with IDNet interface.

[3]) Intended for series EW and DS KERN scales.

Not for Dual ADM:

Scale 1 ADM	**Info**	**Select scale interface:**

ADM1	**ADM in socket ADM1**
SIM 1-x	**via serial interface**
IDN1	**IDN in socket ADM1**
DWB1	**DWB in socket ADM1**

Scale 2 None	**Continue with next scale, (if applicable)**

Options for setting the scale driver:

	ADM1	SIM1	SIM2	IDN1	DWB1
ADM	X				
DWU		X	X		DWB
SBI		X	X		
IdNet		X	X	IDN	
Flintec					DWB
MT-SICS		X	X		
Dual ADM	X				
Kern		X	X		
HBM					DWB

5.2 Configure I/Os

The digital inputs / outputs are always configured in groups of 8 inputs and 8 outputs.

Config. Digital IO		**Configure I/Os**
Group 1: PIM	**Info**	**Select type of digital I/Os:**
	PIM	**Internal I/Os PIM1**
	REL/TRIO	**External relay / transistor module REL485/TRIO485 connected via serial interface**
	None	**Not applicable**

REL/TRIO selected:

Group 1: Port SIM1	**Assignment of an external relay / transistor module to serial interface SIM1 - SIMx**

5.3 Configure Analog Outputs

```
Config.   Analog out
```

```
AOut 1:          MAI
```

Info **Select analog output:**

MAI	**External analog output module**
DAU8	**internal 8-bit analog output module**
DAU15	**internal 15-bit analog output module**
None	**Not applicable**

5.3.1 MAI Chosen

```
AOut 1: Port    SIM1
```

Info **Select pertaining internal serial interface:**
SIM1 - SIMx

```
AOut 1: Address    0
```

Info **Select pertaining internal address:**
Address 0 - Address 7
equivalent MAI Address 16 - Address 23

```
AOut 1: Module    X1
```

Info **Select external MAI module:**
Module X1 - Module X4

```
AOut 1: Mode   0-10V
```

Info **Select type of output signal:**
0 - 10V, 2 - 10V, 0 - 20mA, 4 - 20mA

```
AOut 1: Output Appl.
```

Info **Select operating mode:**

Appl.	**Controlled by application program**
Gross	**Gross weight**
Net	**Net weight**

Gross or Net selected:

```
AOut 1: Scale      1
```

Info **Choose scale for output of gross / net weight.**

```
AOut 1:Calibration N
```

Info **Calibration of output signal:**

N	**Skip and continue**
Y	**Calibrate output signal, connect multimeter**

Calibrate output signal (Calibration = Y):

```
AOut 1:   0V =     9
```

Info **Calibrate zero signal, e.g. =0V.**
Stepwise increase / decrease analog signal.

```
AOut 1: 10V =   4095
```

Info **Calibrate full signal, e.g. 10V.**
Stepwise increase / decrease analog signal.

Note: The calibrated values are overwritten when the type of the output signal is changed.

5.3.2 DAU15 Chosen

AOut 1: Port PIM1	Info	Select pertaining internal digital interface: PIM1
AOut 1: Mode 0-10V	Info	Select type of output signal: 0 - 10V, 2 - 10V, 0 - 20mA, 4 - 20mA
AOut 1: Output Appl.	Info	Select operating mode: Appl. Controlled by application program Gross Gross weight Net Net weight

Gross or Net selected:

AOut 1: Scale 1	Info	Choose scale for output of gross / net weight.
AOut 1:Calibration N	Info	Calibration of output signal: N Skip and continue Y Calibrate output signal, connect multimeter

Calibrate output signal (Calibration = Y):

AOut 1: 0V = 9	Info	Calibrate zero signal, e.g. = 0V. Stepwise increase / decrease analog signal.
AOut 1: 10V = 4095	Info	Calibrate full signal, e.g. 10V. Stepwise increase / decrease analog signal.

Note: The calibrated values are overwritten when the type of the output signal is changed.

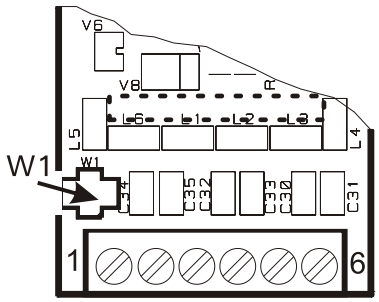
6 Calibration Mode

Described below is only the *access* to the calibration mode, for a detailed description of the calibration procedure refer to the following manuals:

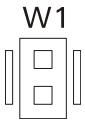
- **ADM / DUAL-ADM / ADM8000-Exi Calibration Manual, order-No.: ST.2309.0688**
- **Flintec / HBM Calibration Manual, order-No.: ST.2309.1568**
- **MultiRange Calibration Manual, order-No.: ST.2309.0057**

Described below is only the *access* to the calibration mode.

Prior to power up the jumper W1 must be removed. Only with this jumper setting can the changed parameters be saved in memory after the calibration



Calibration released



In Service Mode call up group 'Calibrate'.

Calibrate Scale 1	< >	**Choose any of the installed scales**
	F1	**Show error protocol of scale see section 'Error Log'**
	↵	

If jumper W1 is still in place:

Calibration Locked		**Warning: jumper not in calibration position, parameters cannot be saved!**
	↵	**Enter calibration mode without saving (e.g. to check settings)**

Note: Left to the display with the calibration steps, the number of the selected scale is shown [W1], [W2], etc.

After pressing the ↑ -key to exit the calibration mode:

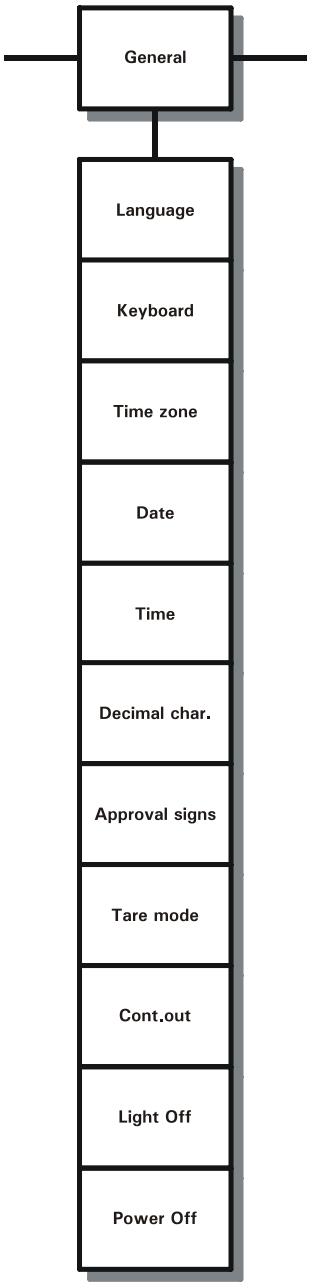
Save Parameters ? N		**Save parameters in EEPROM**
	Info	**Scrolling or**
	1	**Y(es): Save parameters**
	0	**N(o): Ignore all changes, do not save data**

If jumper W1 on ADM module is still in place:

Error Calibr. Jumper		**Error message: jumper not in calibration position, parameters cannot be saved!**
	↵	**Exit calibration without saving**

7 Entry Of Parameters (General)

Choose group 'General' from 'Setup: Service' menu.



Language: German	**Info**	**Select language:** **German** **English** **French** **Polish** **Dutch** **Italian** **Spanish** **Danish** **Swedish** **Norwegian** **Greek** **Czesh**

All languages except German:

```
Keyboard:          US
```

Info **Keyboard layout:**
US = US layout
GB = Britisch layout

```
Time Zone:         CET
```

Info **Select time zone.**
CET = Central European Time
Other time zones:
Canada, EET, EST, Etc, Europe, GB, GMT, HST, MET, MST, Mideast, NZ, Pacific, Singapore, UCT, US, UTC, WET, Africa, America, Asia, Atlantic, Australia, Brazil
Note: For some entries the particular location must be specified, e.g. 'Pacific-Apia'.
With 'Etc' a time difference to GMT can be chosen.
Automatic summer / winter time switching is made in accordance with the chosen time zone.

! CAUTION
After changing the time zone, current time must be entered under menu item 'Settings' (see operation manual of application software).

```
Date:       DD.MM.YY
```

Info **Select format of date:**

DD.MM.YY	**MM.DD.YY**	**YY.MM.DD**
DD-MM-YY	**MM-DD-YY**	**YY-MM-DD**
DD/MM/YY	**MM/DD/YY**	**YY/MM/DD**
DD.MM.YYYY	**MM.DD.YYYY**	**YYYY.MM.DD**
DD-MM-YYYY	**MM-DD-YYYY**	**YYYY-MM-DD**
DD/MM/YYYY	**MM/DD/YYYY**	**YYYY/MM/DD**

```
Time:       HH:MM
```

Info **Select format of time:**
HH:MM **HH:MM:SS**
H = hour **S = second**

```
Decimal Char.:    .
```

Info **Select character to separate decimals:**
Dot (e.g. 0.00)
Comma (e.g. 0,00)

```
Approval Signs:     N
```

Info **Select approval signs:**

Y(es): Weights are printed with approval signs in compliance with former PTB regulations:

Example: Gross/Tare/Net
`<25.45kg> / <10.00kg>  / <15.45kg>`
or `<25.45kg> /  10.00kgPT / 15.45kgC`

N(o): Weights are printed in compliance with EC regulations:

Example: Gross/Tare/Net
`25.45kg / 10.00kgT  / 15.45kgN`
or `25.45kg / 10.00kgPT / 15.45kgN`

Taremode Gross/Net	Info	**Select tare mode:** **Gross/Net = press tare key to toggle gross / net display and back;** **Auto Clear = on return to the zero range the tare weight is automatically cleared;** **Net = 0 = every time the tare key is pressed the scale is autotared, on return to the zero range the tare weight is automatically cleared and the display returns to gross mode.**
Cont.out: Off	Info	**Setting for continuous output:** **SysTec — SysTec format** **Flintec — Flintec format** **Customized — Freely defined format** **Sys.Remote — RemoteDisplay** **Toledo — TOLEDO® format** **Schauf — Schauf format** **CAS — CAS format** **GS — Gebhardt&Schaefer protocol with support of traffic light function** **Spec1 — Customized format** **Off — Continuous output disabled**

Data strings of the continuous output are described in chapter 'Continuous Output'.

Continuous output enabled:

Cont.out: SIM1	Info	**Choose serial interface for continuous output: Eth, SIM1 – SIMx**

Eth chosen:

Cont.out port:99999	**TCP/IP port for the external connection. Default: 1900**

Customized format chosen:

:AAAAAAAAAA	**String for freely defined format, see chapter 'Continuous Output'.**

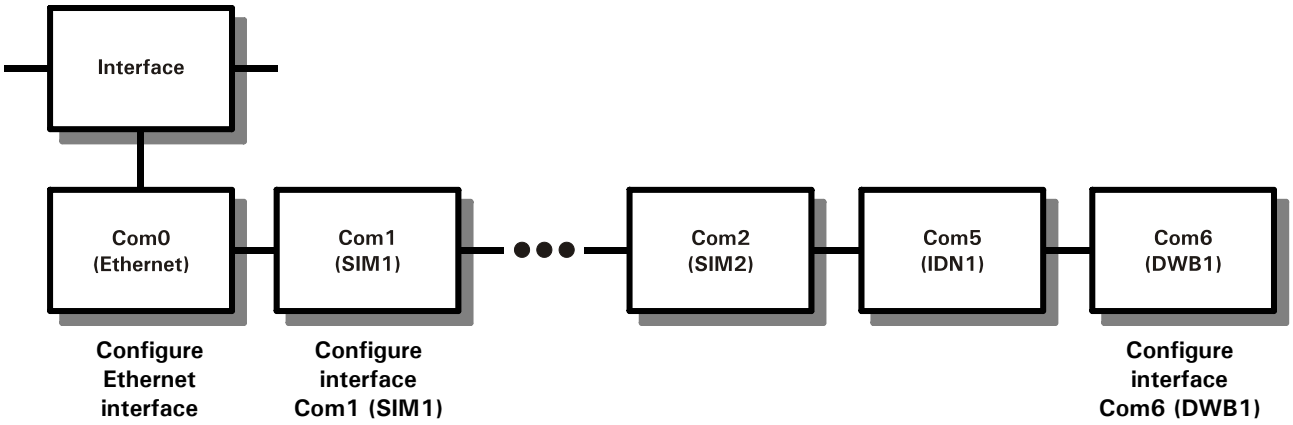
Cont.out rate: 99	**Entry of number of updates per second for the continuous output.**
Light Off (Min.) 99	**If terminal is not in use, the backlighting is switched off after this time has elapsed (powersave function for battery operated terminals). Press any key to switch backlighting on again. Enter 0 to disable this function.**
Power Off (Min.) 99	**Enter time in minutes after which, when unit is not in use:** • **the device is switched off (only for IT3000M-BATT)** • **the display only is switched off (all versions except IT3000M-BATT)**

NTA power supply unit installed:

Power supply PB12	Info	**Chosse type of connected supply voltage:** **PB12** 12V lead battery **PB24** 24V lead battery **Line** mains supply

8 Interface Configuration

Choose group 'Interface' from 'Setup: Service' menu.



Note: The setting of parameters must correspond to those of the connected peripheral devices.

8.1 Configuration Of Ethernet Interface

Interface Com0(Eth)

↵

Com0: Port 99999

Enter port

Com0: Protocol None

Info **Select protocol of Com0:**

None	**Raw data only**
TTY	**Printer protocol (data only)**
AckNak	**ACK / NAK procedure with confirmation**
NoAck	**NO-ACK procedure without confirmation**

If TTY was selected as printer protocol:

Com0: Codepage None

Info **Select character set of output:**

None	**ISO8859 in accordance with chosen language**
850	**DOS Codepage 'Western Europe' (obsolete printers)**
852	**DOS Codepage 'Central Europe'**
866	**DOS Codepage 'Russia'**

If AckNak or NoAck was selected as protocol:

Com0:Start Char 999		Entry of start character as decimal value (e.g. 2 = STX) For entry '0' no start character is transmitted.
Com0:End Char 999		Entry of end character as decimal value (e.g. 3 = ETX) For entry '0' no end character is transmitted.
Com0: Checksum None	Info	Select method to calculate the checksum which is transmitted behind the end character: Checksum None No Checksum Checksum XOR Exclusive-Or Checksum Checksum CPL Complement of two

If a start or end character was specified and a checksum was selected:

Com0:With Start N	Info	The start character is included in the checksum calculation
Com0:With End N	Info	The end character is included in the checksum calculation

8.2 Configuration Of Serial Interfaces

Interface Com1(SIM1)	Info	Continue with interface Com1
Com1: Baud 9600	Info	Select baud rate of Com1: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Com1: Databits 8	Info	Select data format for serial interface Com1: 7 data bits, 8 data bits. Always 1 stop bit is transmitted.
Com1: Parity None	Info	Select parity for interface Com1: None Even Odd
Com1: Ctrl. None	Info	Select hardware handshake for interface Com1: XOn/XOff RTS/CTS None no transmission control Note: RTS/CTS not possible on Com2!
Com1: Protcl. None	Info	Select protocol of Com1: None Raw data only TTY Printer protocol (data only) AckNak ACK / NAK procedure with confirmation NoAck NO-ACK procedure without confirmation

If TTY was selected as printer protocol:

Com1: Codepage None	Info	**Select character set of output:** **None ISO8859 in accordance with chosen language** **850 DOS Codepage 'Western Europe' (obsolete printers)** **852 DOS Codepage 'Central Europe'** **866 DOS Codepage 'Russia'**

If AckNak or NoAck was selected as protocol:

Com1:Start Char 999		**Entry of start character as decimal value (e.g. 2 = STX)** **For entry '0' no start character is transmitted.**
Com1:End Char 999		**Entry of end character as decimal value (e.g. 3 = ETX)** **For entry '0' no end character is transmitted.**
Com1: Checksum None	Info	**Select method to calculate the checksum which is transmitted behind the end character:** **Checksum None No Checksum** **Checksum XOR Exclusive-Or Checksum** **Checksum CPL Complement of two**

If a start or end character was specified and a checksum was selected:

Com1:With Start N	Info	**The start character is included in the checksum calculation**
Com1:With End N	Info	**The end character is included in the checksum calculation**

Interface Com2(SIM2)	Info	**Continue with following interfaces.**

9 Network

Choose group 'Network' from 'Setup: Service' menu.

Note: This menu is only available when network connection has been established.

Network settings for Ethernet interface of weighing terminal:

IP 10. 0. 10. 9		**Entry of IP address for the local net:** **Note: The weighing terminal does not support DHCP and requires a permanent IP address.**
Mask 255.255. 0. 0		**Entry of subnet mask**
Gate 0. 0. 0. 0		**Entry of gateway**
DNS 0. 0. 0. 0		**Entry of DNS server**
NTP 192. 53.103.108		**Entry of NTP server for time synchronization, this requires entry of time zone.** **Applicable only if time zones are supported by the firmware.**
Example for ptbtime1.ptb.de		
FTP Pwd:9999999		**Entry of password for FTP access to the shared directory** **F– Activate alphanumeric entries** **F. Activate numeric entries**
Web Access Off	**Info**	**Enable / disable access to data via web browser.**

Web Access = On:

Web Pwd: 9999999	**Specify administrator password** **F– Activate alphanumeric entries** **F. Activate numeric entries**
Access No. 99	**Max. number of users who may be logged in at the same time.**

Terminal No.: 999	**Entry of terminal-No. for the network name.** **The network name is generated from the terminal type and the terminal-No.** **Example: IT4000E_001, IT8000E_123**

9.1 Auto PING

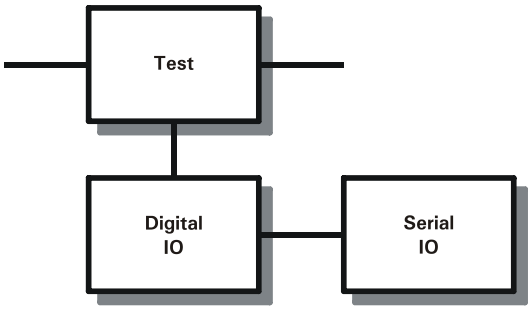
In some networks ARP broadcast may be disabled which can lead to problems with the communication between WLAN controller and the module. In this case, sending an ICMP package to the network gateway at regular intervals can rectify the problem. The effect is that the IP address and the hardware address are entered in the controller. Since the controller discards this information after a few minutes, it is required to send the package at regular intervals. When 'Auto Ping' is enabled, an ICMP package is sent every 60 seconds.

Start auto ping Y	**Start sending ICMP packages to the gateway.**

10 Test (Hardware)

W A R N I N G
Exercise utmost care when making checks, tests and adjustments that can actuate movable parts such as feeding devices, gates, flaps, conveyors, etc. Make absolutely sure that nobody is within reach of movable parts.
Failure to observe this precaution could result in bodily injury!

Choose group 'Test' from 'Setup: Service' menu.



10.1 Test Of Digital Inputs/Outputs

```
Test:     Digital IO
```

↵

```
G1 1  In:00000010 Out:00000001
```

Status information 0 or 1 for the first I/O group. Inputs are shown on the left, outputs on the right hand side. (1 = input/output 'on').

The keys 0 - 1 are used to toggle the outputs 0 to 1.

The picture above shows the state:

input 0, 1	**= Off**	**input 1**	**= On**
output 0	**= On**	**output 1**	**= Off**

10.2 Test Of Serial Interfaces

```
Test: Serial IO
```

↵

```
Com1: nok
```

Test of serial interfaces (RS232 and RS485-4-wire);

RS232: jump lead from terminal 1 to 3 and from 2 to 4 (connect RTS with CTS and TxD with RxD).

RS485.4: jump lead from terminal 1 to 3 and from terminal 2 to 4 (connect TxD+ with RxD+ and TxD− with RxD−).

Note: Test of 20mA interfaces is not possible.

```
Com2: nok
```

Info **Continue with next interface.**

11 Reset

With this function values and parameters of the Service Mode can be reset to factory settings. Parameters for calibration and network configuration remain unchanged.

Choose group 'Reset' from 'Setup: Service' menu.

11.1 Reset Parameters

Reset Parameters? Y

Y **Reset parameters of Service Modes.**

Group	Setting		Setting
Interface	Com0: Port 1234		Com1: Ctrl. None
	Com0: Protocol None		Com1: Protocl. None
	Com1: Baud 9600		Com1: Start char. 0
	Com1: Databits 8		Com1: End char. 0
	Com1: Parity None		Com1: Checksum None
General	Language: German		Tare mode: Gross/Net
	Date: DD.MM.YY		Cont.out Off
	Time: HH:MM		Light Off (Min.) 0
	Decimal char.: Dot		Power Off (Min.) 0
	Approval signs: N		
Config. Scale	Scale 1: ADM		Scale 2: None
Config. Digital IO	Group 1: PIM		Group 2: None
Config. Analog out	AOut 1: None		
Config. Analog in	AIn 1: None		

11.2 Reset Approved Weight

CAUTION
All records in the W&M approved data archive are irrevocably deleted without further prompt for confirmation.

Reset Approved Wgt Y

Y **Delete W&M approved data archive**

Service: Reset

12 Setup: Application (Choose Operating Mode)

Setup: Application		**Choose operating mode**
Application: Basic	**Info**	**Select operating mode:** **Basic = data logging / capturing** **Count = parts counting** **Truck = truck weighing** **Fill 1 = filling mode 1** **Check = checkweighing** **Online = remote control from PC** **Truck/Online = remote control from PC with offline truck weighing mode** **Basic/C = combined operating mode, Basic or Count selectable *)** **Fill 2 = filling mode 2** **Online AN = *custom program*** **Online SIR = *custom program*** **Online BDI = *custom program***

***) Special charasteristics of the operating mode 'Basic/Count':**

- **data transmission is always disabled;**
- **in the configuration block 1 is assigned to the Basic sequence, whereas block 2 is reserved for Count, block 3 is used as totals part for both.**

After change of operating mode:

Set defaults? N	**Info**	**Set defaults of chosen operating mode, such as parameters and print format.** **Attention! Parameters and print format of the previous operating mode are deleted. If required, save data before loading defaults!**
Resetting...		**Loading defaults**

Operating mode 'Count' or 'Basic/Count' selected:

Ref.Scale No	**Info**	**External reference scale connected?:** **No = no reference scale** **COM1 Sart = Sartorius scale on COM1** **COM2 Sart = Sartorius scale on COM2** **COM1 Kern = Kern scale on COM1** **COM2 Kern = Kern scale on COM2** **COM1 AND = A&D scale on COM1** **COM2 AND = A&D scale on COM2** **COM1 OHAU = OHAUS scale on COM1** **COM2 OHAU = OHAUS scale on COM2**

Note: The connection of 3 scales (DUAL-ADM plus external reference scale) is not supported.

The connection of an additional reference scale requires that identical interface parameters of terminal and scale are configured and that the reference scale is set to continuous mode in compliance with specification listed below:

Sartorius:	**MC1 protocol (SBI)**
Kern:	**all models of series 572, 770, GS, EW, GJ, DS and KB**
A&D:	**series FH and compatible models, setting: Standard Format**
OHAUS:	**Explorer interface**

Reference scale selected:

Ref.scl.port: Com1	Info	Interface of reference scale: Com1 – ComX
Ref.Scale Unit = kg	Info	Unit of calibration of reference scale: Unit = kg Unit = g

Operating mode 'Truck' or 'Truck/Online' selected:

1st Weight Ticket? Y	Info	Printing of weighticket for first weighing enabled / disabled.
No. Fix Storages 99		Number of reserved entries in the first weight memory. If trucks with known tare weights are weighed, these tare weights can be stored in a reserved part of the first weight memory, whose size is specified here. The reserved part of the memory is not available for the dynamic assignment of first weights. The total number of entries in the first weight memory (reserved and dynamically assigned) is 99. Note: If 99 is entered, no first weights can be stored.
Onl.Traffic Light: Y		Traffic light control for online application.

Operating mode 'Basic' selected:

Auto Print? N	Info	N(o) Disable automatic printing Y(es) Enable automatic printing after placing load on scale and reading a settled weight. Note: This function requires the entry of a weight threshold (setpoint 1), greater zero and smaller than the actual weight.

With this function a print is released automatically after the weight threshold entered with setpoint 1 is exceeded and a settled weight is detected. The next print cycle is started when first the weight fallls below the threshold and then exceeds it again.

Operating mode 'Fill 2' selected:

Cont. with Start? N	Info	Automatic start after signal 'Interrupt E1': N Filling is automatically continued after signal E1 is reset. Y Filling is only continued with a new start signal on E0 after signal E1 is reset.

Operating mode 'Fill 1' or 'Fill 2' selected:

Fast=Out0+Out1? Y	Info	Enable / disable simultaneous setting of outputs fast and slow when filling with fast speed.

Operating mode 'Count' selected:

AutoTare(G > S1) Y	Info	Y: Setpoint S1 is used to tare scale when gross weight is greater than setpoint S1 N: Setpoint S1 can be used for other functions

Out0: Not used	Info	**Select control of output Out0:** **Digital output (installation of PIM required)** **Net < S1 = set if net weight < S1** **Net > S1 = set if net weight > S1** **Net in S1-S2 = set if net weight > S1 and < S2** **Net out S1/2 = set if net weight < S1 or > S2** **Gross < S1 = set if gross weight < S1** **Gross > S1 = set if gross weight > S1** **Gross in S1-S2 = set if gross weight > S1 and < S2** **Gross out S1/2 = set if gross weight < S1 or > S2** **Printer On/Off = control output for printer *)** **Not used**
Out1: Not used	Info	**Select control of output Out1:** **see Out0**

***) In the operating mode 'Basic', 'Count' and 'Basic/Count' the output Out1 can be used to switch on a printer only when it is actually in use (power save mode for mobile weighing). If this function is enabled, the output to control the printer is on for 15 sec after power up, and for 1 sec before, during and 15 sec after printing.**

Note: The free assignment of functions to the outputs Out0 and Out1 applies only to the operating modes 'Basic'. In the operating mode 'Count' only the output Out1 can be used freely, and in all other cycles this assignment is part of the application program.

Only if DUAL-ADM scale interface is installed:

Sel: W1 Out0 W1 Out1	Info	**Choose assignment of outputs Out0 and Out1 to scale 1 and 2:** **W1 Out0 W1 Out1 = Scale 1 controls both outputs, scale 2 does not control outputs;** **W1 Out0 W2 Out1 = Scale 1 controls output Out0, scale 2 controls output Out1;** **W2 Out0 W2 Out1 = Scale 2 controls both outputs, scale 1 does not control outputs.**
Wgt.Disp.: Standard	Info	**Select display mode:** **Standard = The weight display shows the gross weight and if the scale is tared the net weight.** **With tare = The display shows in one line the net and the tare weight.**
Host port: Ethernet	Info	**Interface for data transmission:** **Ethernet** **COMx = via serial interface**
Printer port: COM1	Info	**Printer interface:** **COMx = via serial interface** **None = no printer**

Operating mode 'Online' or 'Truck/Online' selected:

Taring: Locked	Info	If requested, the tare functions can be enabled Locked Tare function disabled Free Tare function enabled
Alibi Printer? N	Info	Enable / disable alibi printer. If enabled, a one-line printout is made with date, time, consecutive-No. and gross / tare / net weight after each successful data transmission against an RN command. The printout cannot be changed and is configured for an 80-column printer. N Alibi printer disabled Y Alibi printer enabled

Operating mode 'Truck' or 'Truck/Online' selected:

Max.Truck Wgt:123456	Max. permissible truck weight for second weighing, if exceeded, error message 'Truck too heavy!' is shown.
Terminal No. 999	Enter terminal-No. for data transmission.

IDNet scale 1 or scale 2:

IDNet test Y	For internal IDNet test press F3.

Assignment of inputs and outputs depending on chosen operating mode:

Operating Mode	Input E0	Input E1 [1])	Output A0	Output A1
Basic	Start / Enter	Taring	Function depends on Service Mode settings	
Count	Start / Enter	Taring [2])	Function depends on Service Mode settings [3])	
Truck	Start	—	Traffic lights	
Fill	Start / Stop	Interrupt	Feeder fast speed	Feeder slow speed
Check	Start / Enter	Taring	Result of check: 'Weight ok'	Result of check: 'Out-of-tolerance'

[1]) When an incline sensor is connected to input IN1 (mobile weighing), external taring via this input is not possible.

[2]) When a DUAL-ADM module is installed for the connection of two scales, the currently displayed scale is tared. An optional serially connected reference scale cannot be tared.

[3]) If the function 'Serial Mode' is activated in the operating mode Count, the output A0 is not available since the setpoint S1 is used to enter the threshold.

Relay module with additional outputs:

If an external relay module is connected, two additional outputs are available in operating mode 'Fill 2':

- **Output A2 signals a completed filling cycle. The container can then be removed from the scale.**
- **Output A3 signals 'Ready for start'. Start can then be released via Enter-key or input signal E0.**

13 Operating Modes

13.1 Weighing Functions

The initial step for all operating modes is the display of the weight. In this step the elementary scale functions are accessible.

W1 25.60 kg	**Display of gross weight**
	For multiple-range scales the valid range (e.g. 1.2) is shown on the left hand side, for scales with only one range always W1 is indicated.
	→0← **Set gross weight to zero (only within selected range for pushbutton zero)**
	F8 Call up Supervisor Mode

Setting in Service Mode 'Wgt.Disp.: With Tare':

1 25.60kg 0.00	**Display of gross weight when scale is not tared;**
1 15.40kgNET 10.20	**or display of net and tare weight when scale is tared.**

Only with DUAL-ADM scale interface for connection of two scales:

W1 15.40 kg NET	**Display of gross or net weight of scale 1**
	F2 Switch to scale 2
W2 100.20 kg	**Display of gross weight scale 2**
	F1 Switch back to scale 1
W1 25.60 kg	**Display of gross weight of scale 1 (tare is cleared)**

Show weight with tenfold resolution:

W1 25.60 kg	**Display of gross weight**
	F0 Switch weight display to tenfold resolution
X10 25.604 kg	**Weight display with tenfold resolution** **Display is switched back after 5 sec**

Set gross weight to zero

W1 0.02 kg	**Display of gross weight**
	→0← **Set gross weight to zero (only within selected range for pushbutton zero)**
W1 Ø 0.00 kg	**Gross weight set to zero**

Autotare

W1 25.60 kg

Autotare: By pressing the Tare-key the scale is tared

W1 0 kg NET

Clear tare and return to indication of gross weight

W1 25.60 kg

Manual tare:

W1 25.60 kg

0...9 **Manual tare: After pressing a numeric key, entry of manual tare is enabled,**

Tare Input __10.20

↵ **after entry of a complete tare weight and pressing the Enter-key the net weight is displayed.**

W1 15.40 kg NET

Show tare weight:

W1 15.40 kg NET

Info **Press Info-key to display tare weight.**

10.20 kg TAR

Tare weight when scale was autotared

or

10.20 kg PT

Tare weight when scale was manually tared

Info **Return to display of net weight**

W1 15.40 kg NET

Note: In the operating mode 'Truck' the tare function is disabled.

Print and totalize:

W1 25.60 kg

↵ **Release printing and totalizing at the end of a weighing cycle.**

P1 25.60 kg

P1 appears on the display instead of W1 during printout and data transmission and also while waiting on a settled weight after releasing a printout.

13.1.1 Tare Memory

Entry of tare value into tare memory:

W1 25.60 kg	
	Info **Press Info-key in the initial step of the sequence to display tare weight.**
0 kg TAR	**Example: tare is not yet tared.**
	↵ **Continue with entry of tare weights into tare memory (for each scale up to 9 tare values can be stored).**
Memory 1 10.00	**Display of first tare value.**
	Clr **Clear value and enter new one via keyboard.**
Memory 1 12.00	
	↵ **Continue with next tare value,**
Memory 2 4.00	**after the ninth value return to display of weight.**

Recall of tare value from tare memory:

W1 25.60 kg	**Initial step of sequence with display of gross weight.**
	– 9 **Recall tare value by entry of hyphen (–) and subsequently number of tare memory (1 - 9).**
S1 12.00 kg PT	**Display of chosen tare value for approx. 1 sec,**
W1 13.60 kg NET	**after that display of net weight.**
	Info **By pressing the Info-key the tare weight can be checked.**
12.00 kg PT	

13.2 Tare Functions

In the Service Mode, Group 'General' one of 3 different tare modes can be chosen.

13.2.1 Set / Clear Tare

With each actuation of the tare key the display is switched from gross to net and back (setting: 'Taremode: Gross/Net'). This is the usual tare function which is appropriate for most applications.

13.2.2 Autoclear Tare

The loaded scale can be tared only once, and the net display is automatically switched back to gross when the scale returns to the zero range (setting 'Taremode: Auto Clear').

This function must be activated by the operator by pressing the F1 key in the basic step of the sequence, it is useful for serial weighings with changing tare weight.

W1 25.60 kg	**Display of gross weight**
F1	
Auto clear tare on	**Display for approx. 1 sec, autoclear is now activated.**

The autoclear function can be disabled by pressing the F1 key again, then the scale can only be tared once and the tare weight remains stored until F1 is pressed to again enable autoclear. This function is useful for serial weighings with identical tare weight. After power up autoclear is disabled.

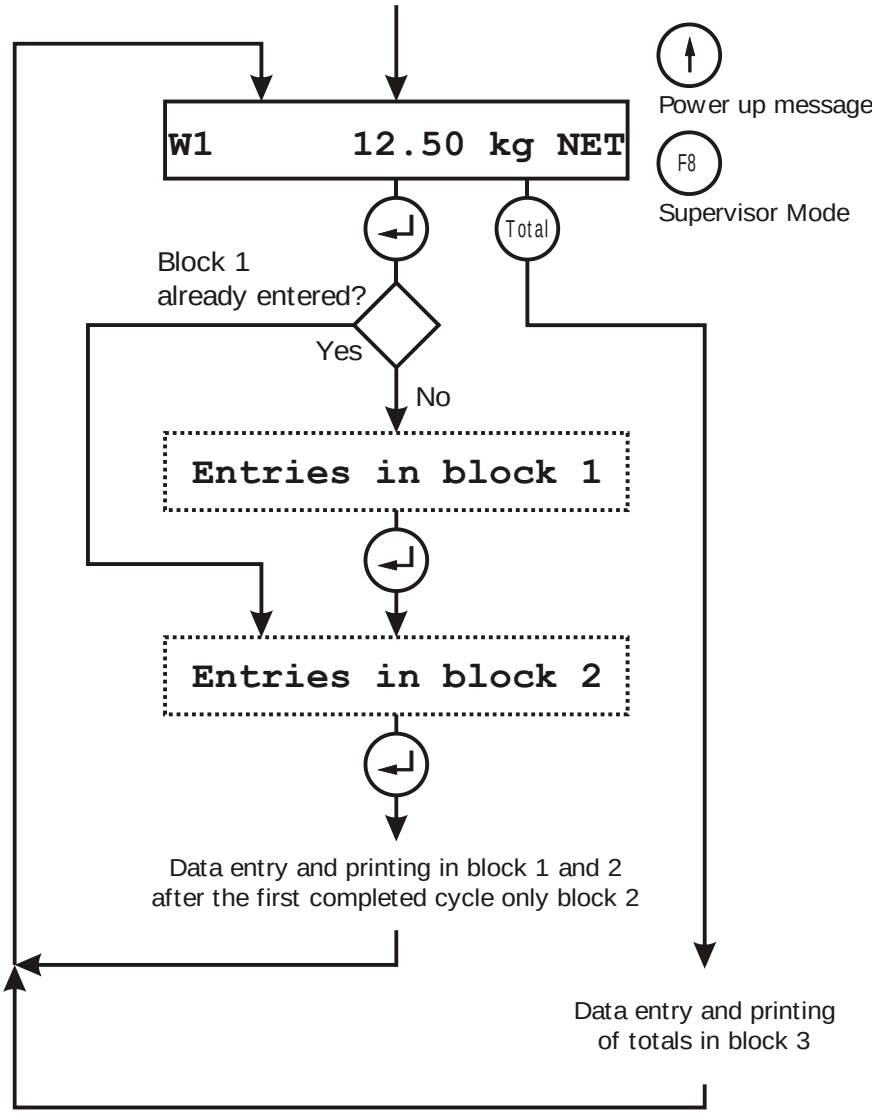
W1 25.60 kg	**Display of gross weight**
F1	
Auto clear tare off	**Display for approx. 1 sec, autoclear is now deactivated.**

13.2.3 Repetitive Tare

With each actuation of the tare key the scale is tared anew. The net display is automatically switched back to gross when the scale returns to the zero range (setting 'Taremode: Net = 0').

13.3 Operating Mode 'Basic'

Principal program structure



After the start of the sequence, the operator is prompted for the entry of the IDs defined in block 1 (header section), e.g. customer-No. for a delivery note, followed by block 2 (cyclic part) with the entry of the pertaining IDs, e.g. article-No. Then the weight is captured and data are printed as defined in block 1 and 2. After block 1 has been carried out once, it is skipped for all following cycles. The cyclic part can be executed as many times as required. After the last weighing cycle in block 2 (with printout) and pressing the Total-key the program proceeds to the sequence for block 3 (totals section) to print, for instance, a line with the totals of all transactions. After that the program returns to the entries in block 1.

This structure provides many options for the configuration of operating sequences with a varying level of complexity. A simple data logging sequence, for instance, can be configured with block 2 only, while omitting of the other two blocks.

Independently of data entry and printing the two setpoints for the outputs A0 and A1 are monitored in the background. The two inputs are active in parallel to the keyboard functions:

rising edge E0 ↵

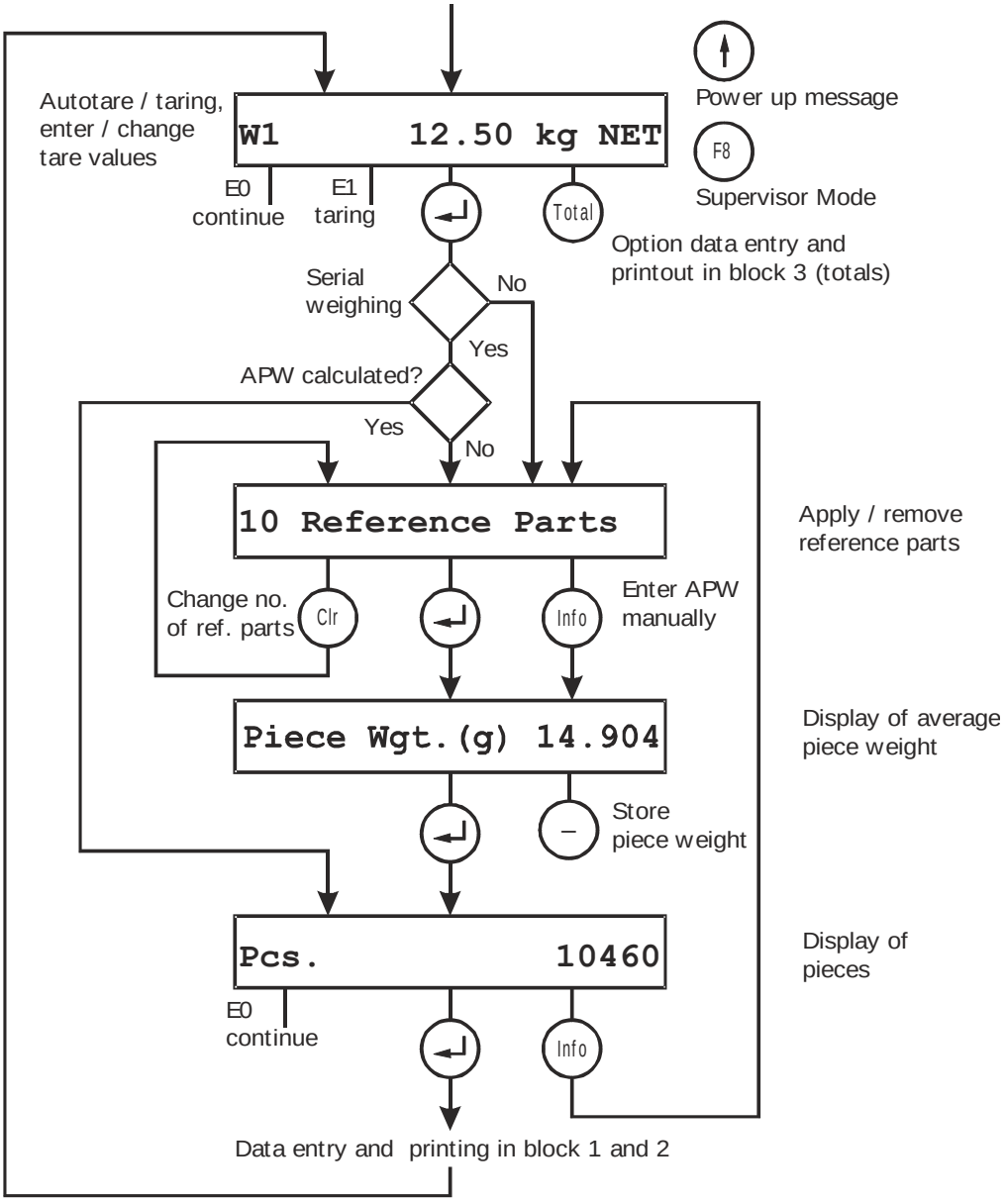
rising edge E1 →T

See chapter 'Configuration Examples' for details on how to configure print formats and operating sequences.

Automatic printing after loading the scale and reaching a settled weight can be enabled in the Service Mode, group 'General'.

13.4 Operating Mode 'Count'

Principal program structure with one scale



The operating mode 'Count' provides the typical parts counting functions to determine the unknown number of pieces by comparing the weight of a specified number of reference parts with the unknown quantity.

Reference parts

By default the number of reference parts is 10, but it can be changed freely by the operator. Parts can be added or removed.

Storage of reference weights:

For repetitive counting of identical parts, up to 9 reference weights can be weighed or manually entered and stored. Thus it is not necessary to capture the piece weight every time these parts are handled.

Piece Wgt(g) 14.904		Display of weighed or manually entered piece weight.
	–	Enter hyphen (–) to call up storage of piece weight.
S_		Prompt to enter number of piece weight memory (1 - 9).
	1 - 9	
S1		After entry of number of piece weight memory, e.g. 1,
	↵	and confirmation with Enter-key, the number of the memory along with the stored piece weight is displayed for verification.
S1 14.904 g		
	↵	Continue with piece count.
Piece Wgt(g) 14.904		

Taring

Autotare is possible for empty containers with unknown tare, the known weight of a filled container can be entered as manual tare.

Reference Scale

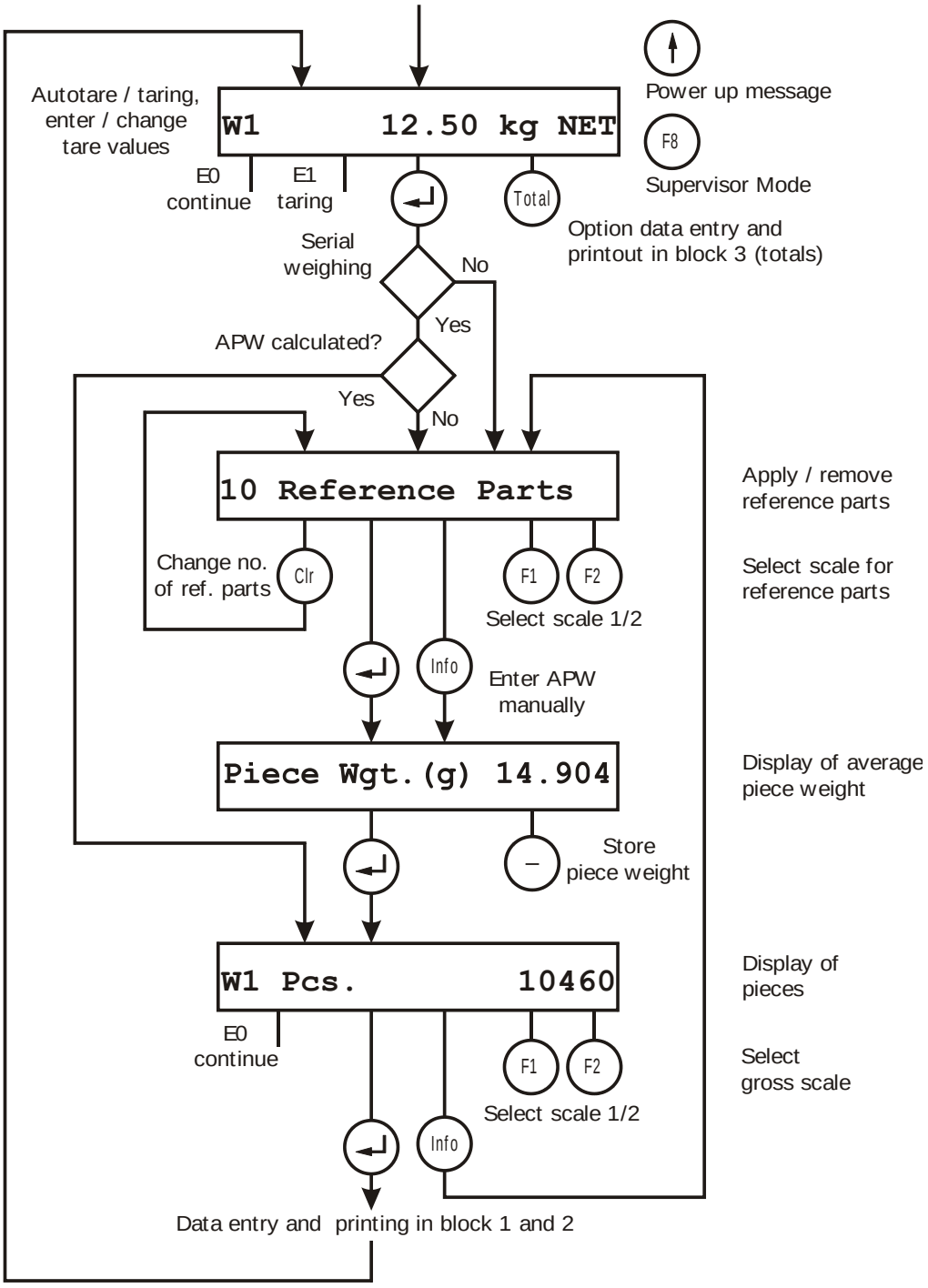
If parts with widely varying piece weight are to be counted, an additional reference scale can be connected to capture the piece weight and -if desired- also the number of pieces. The reference scale is installed as scale W2. The function keys F1 and F2 are used to select the scale in the respective steps of the sequence.

If a second analog scale is connected via a DUAL-ADM module, a serially connected reference scale is disabled.

Piece Weight Optimization

If the system is configured with one scale only, the program automatically optimizes the average piece weight. That makes it possible to start with a small number of counted reference parts, then add -or remove- more parts (which need not be counted). This ensures maximum accuracy for the subsequent counting cycle.

Principal program structure with two scales



Serial weighing

The function 'serial weighing' can be selected in Supervisor Mode, this parameter is used to determine whether the average piece weight is to be stored for the next cycle or whether it is cleared and must be calculated anew.

In this serial mode it is also possible to configure autotaring and automatic continuation of sequence after exceeding an adjustable weight threshold. This function must be enabled In Service Mode with the parameter 'AutoTare(G > S1)=Y' and the threshold must be entered as S1 in Supervisor Mode.

When load is removed from the scale, the weight must first fall below the threshold and then it must exceed the threshold again when the scale is loaded with the next empty container. For S1 = 0, this function is disabled.

Data entry and printing

If input fields are defined in the header section and the cyclic part, these inputs are prompted after the number of parts has been calculated for the first time. Then the fields in blocks 1 and 2 are printed. With every following cycle only fields in block 2 are entered and printed.

If block 3 for totals is configured, the respective inputs / printout is made after pressing the Total-key. After completing the printout, the totals are cleared.

The two inputs are active in parallel to the keyboard functions:

rising edge E0	↵	**acknowledge display of weight and counted parts**
rising edge E1	→T	**taring scale #1**

In the steps with the display of weight and counted parts, a comparison of the weight of scale #1 with the value entered for setpoint S2 is running in the background and the output A1 is set accordingly. The output A0 is not used (S1 is used to set the weight threshold for automatic taring in serial mode).

The operating mode 'Count' supports four different operating modes (with the additional option to switch from scale #1 to #2 in the respective steps of the sequence):

Count unknown number of pieces in a filled container:

- **put filled container on scale**
- **enter known tare weight of container**
- **take reference parts out of container (or weigh on reference scale)**
- **confirm piece weight**
- **put reference parts back into container, read / print calculated number of parts**
- **remove container, start new cycle.**

For the next cycle the tare weight can be cleared and a new one entered. The next parts count can be made either with the stored reference weight (serial weighing) or with a newly determined parts weight (call up with Info-key during serial weighing).

Count specified number of pieces out of a filled container:

- **put filled container on scale**
- **press Tare-key to autotare scale**
- **take reference parts out of container (or weigh on reference scale)**
- **confirm piece weight**
- **take more pieces from container until target reached.**

To remove more parts from the same container in a new cycle, the scale is autotared again in the first step. After that the display shows the number of the parts that are taken from the container.

Count pieces into an empty container:

- **put empty container on scale**
- **press Tare-key to autotare scale**
- **put reference parts into container (or weigh on reference scale)**
- **confirm piece weight**
- **add parts until target reached.**

For a new cycle to count the same parts, the next container is placed on the scale and autotared. After that the display shows the number of the parts that are put into the container. If parts are counted on the platform of the scale without container, the taring step can be skipped.

Serial weighing into empty container with automatic taring:

- **put empty container on scale**
- **press Tare-key to autotare scale**
- **put reference parts into container (or weigh on reference scale)**
- **confirm piece weight**
- **add parts until target reached**
- **remove container from scale**
- **put next empty container on scale**
- **add parts until target reached**
- **remove container from scale, etc.**

This function must be enabled In Service Mode with the parameter 'AutoTare(G > S1)=Y' and the threshold must be entered as S1 in Supervisor Mode.

Note:

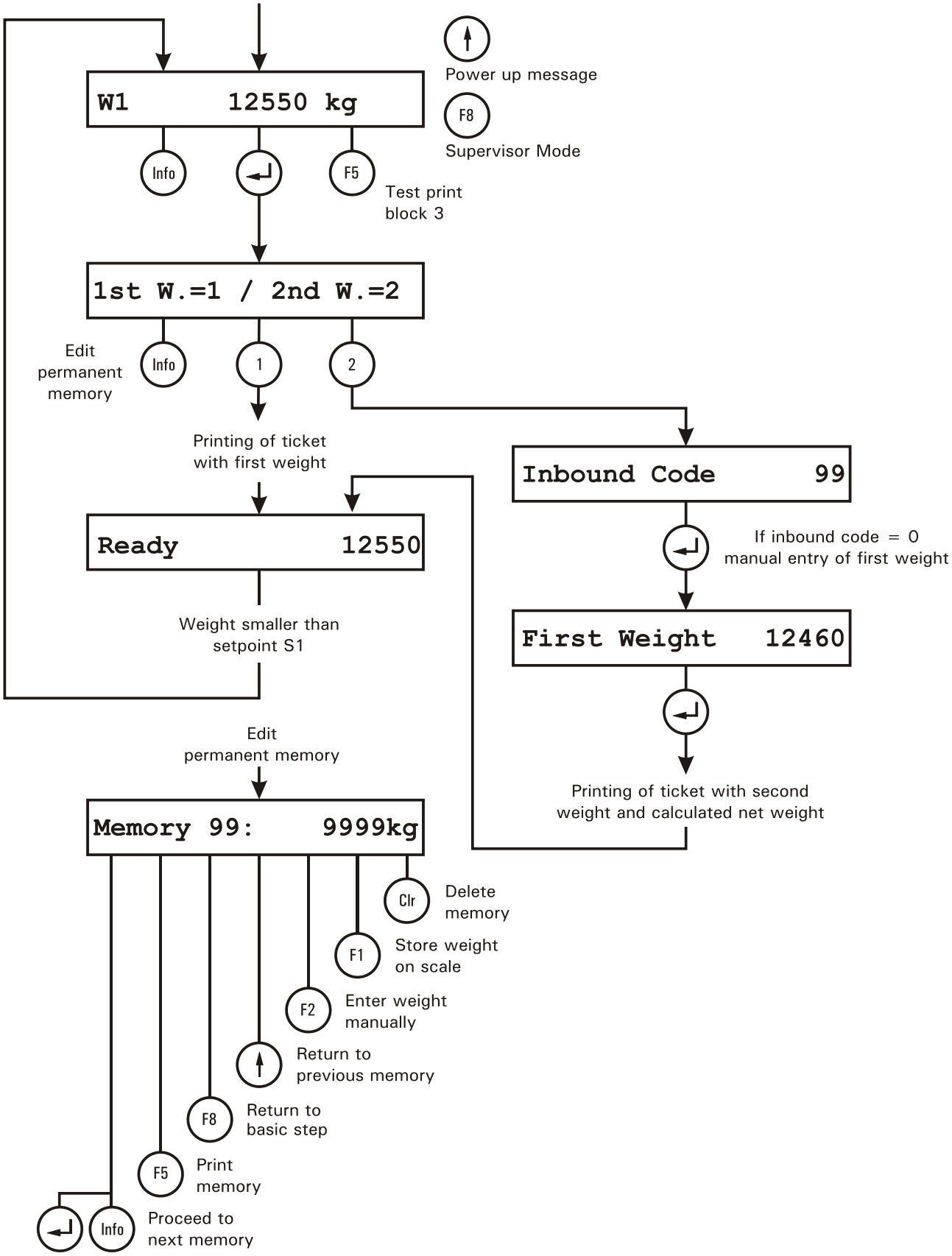
- **An additional refererence scale can only be tared at the scale and not via the Tare-key at the terminal.**
- **When an incline sensor is connected (mobile weighing), external taring via input IN1 is not possible.**

13.5 Operating Mode 'Truck'

13.5.1 With First Weight Printing

Service Mode: Parameter '1st Ticket = Y'

Principal program structure



Sequence: 'With first weight printing'

The operating mode 'Truck' covers a typical truck scale application with first and second weighing and calculation of the difference. The tare function is disabled. The first weight memory has a capacity of 99 records, which can be accessed for the second weighing via a 2-digit ID and which is assigned automatically.

First weight memory

The first weight memory can be subdivided for the storage of known tare weights (e.g. 10 memories for the tare weights of the scale operator's own trucks) while the remaining memories can be dynamically allocated for normal transactions with the capturing of first and second weights. The number of reserved memories is specified for the operating modes 'Truck' and 'Truck/Online' in the group 'General' with the parameter 'No. Fix Storages'.

To enter a weight in the reserved memory, either the truck can be weighed on the scale and its weight stored (call up with F1-key) or the known weight is entered manually (call up with F2-key).

Records stored in the first weight memory can be looked up, printed and deleted, if required. A specific memory location can be selected either by pressing the Info- or Enter-key repeatedly, or by entering the 2-digit ID-number of the memory. All *reserved* memory locations can be looked up, regardless of whether they are in use or empty, whereas in the dynamically allocated part of the memory only currently used records are displayed. The first entered number points to the tens, the second to the lower digit. If the entered ID points to an empty record, the next occupied one is displayed, if all following ones are empty, the program returns to its initial step.

Printing

Printout for the first weighing is defined in block 1, whereas configuration for the second weighing is made in block 2. The consecutive-No. 1 is incremented by 1 with every second weighing and can be used, for instance, as ticket-No. Therefore it is recommended to use consecutive-No. 1 only in the print cycle of the second weighing. Consecutive-No. 2 is incremented by 1 with every first and second weighing and can be used to identify the individual weighings.

Test print

If requested, a test print can be configured in block 3. In this block no formfeed is performed, i.e. printouts appear on paper line after line. For first and second weight printing, formfeed can be enabled in group 'Interface' of the Service Mode.

Traffic lights

The outputs A0 and A1 can be used to control traffic lights:

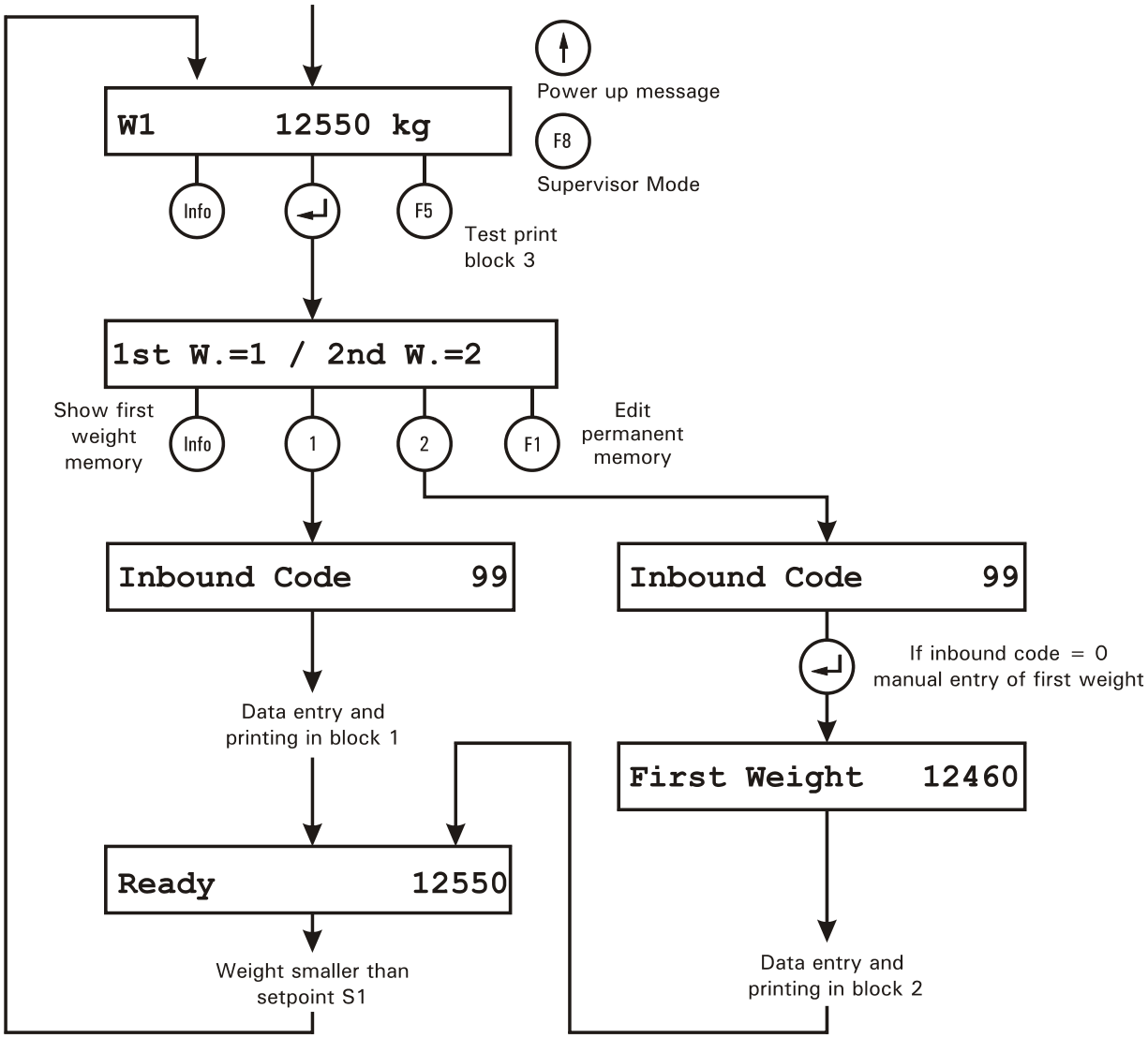
	A0 = 1	A0 = 0	A1 = 1	A1 =0
Ready for start, weight < S1	Access green			Exit red
Truck on scale, weight > S1		Access red		Exit red
Weighing ready, weight > S1		Access red	Exit green	
Weighing ready, weight < S1	Access green			Exit red

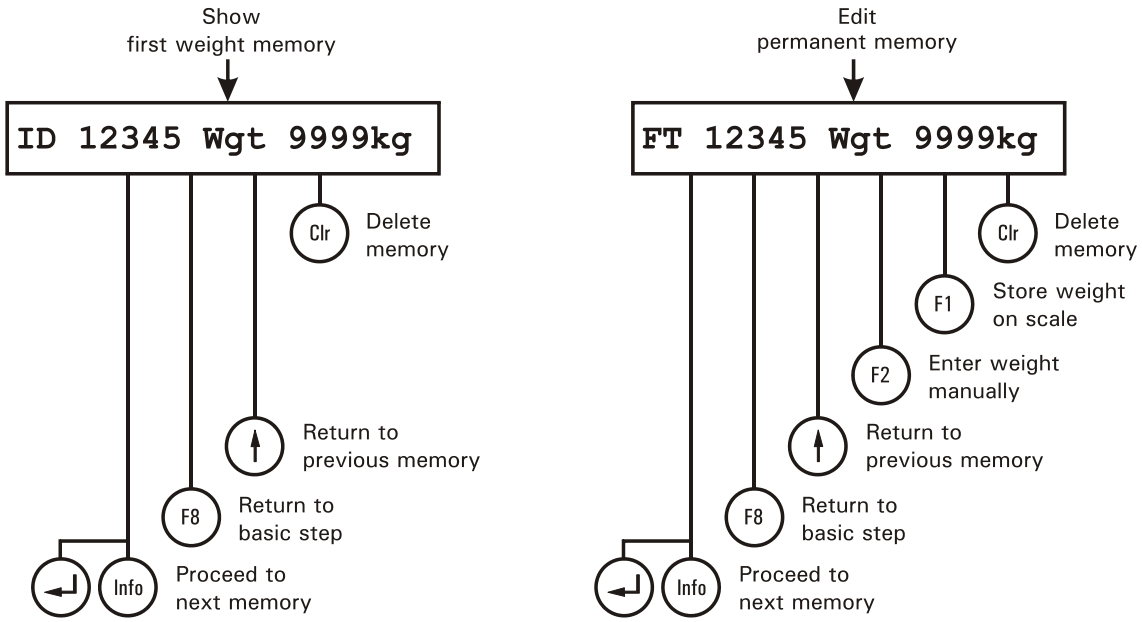
The inputs E0 and E1 are not used.

13.5.2 Without First Weight Printing

Servicemode: Parameter '1st Ticket = N'

Principal program structure





Sequence: 'Without first weight printing'

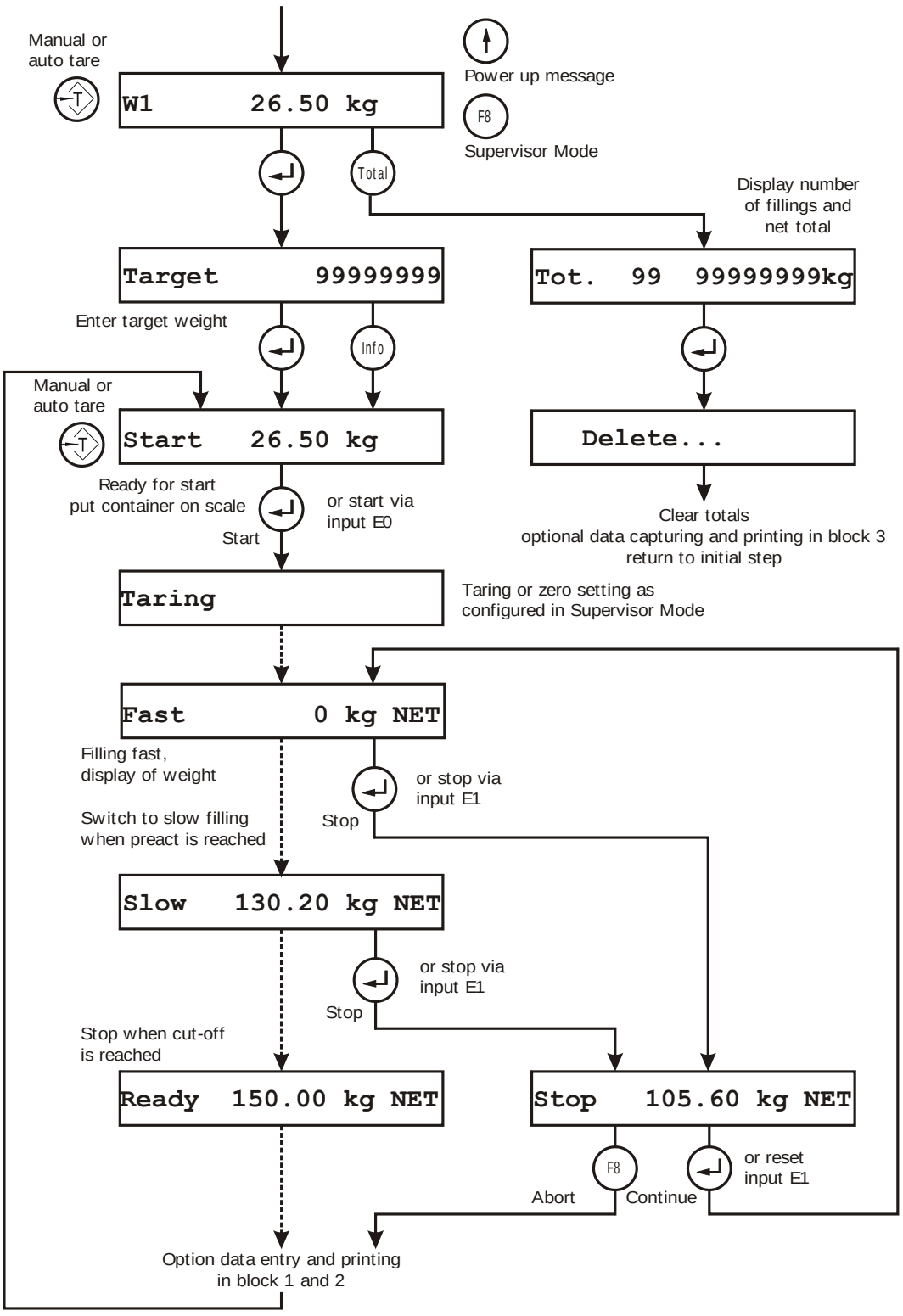
Different from the mode 'With first weight printing' the first weight is stored against a freely selectable 5-character ID, that is used during the second weighing to look up the stored value. Only then a weigh ticket with first and second weight is printed. The first weight memory has a capacity of 99 records.

Permanent memory

The permanent memory for known trucks has a capacity of 99 records that can also be stored against a freely selectable 5-character ID, that is used to look up the weight.

13.6 Operating Mode 'Fill 1'

Principal program structure



The operating mode 'Fill 1' can be used for a simple two-speed filling operation with fast and slow filling. The target value is entered as input step in the sequence. The two setpoints S1 and S2 are used for the calculation of the fast / slow setpoint (S1) and the preact for the in-flight compensation (S2). These values are subtracted from the target value.

Zero setting / taring

Several taring / zero setting options can be selected. The choice is made in group 'Application' in a step that appears only if operating mode 'Fill 1' is enabled. 'FMode(T = 0/Z = 1/F = 2)':

- **0: Scale is autotared prior to every filling cycle (net filling);**
- **1: Scale is set to gross zero prior to every filling cycle (only within zero setting range = Push Button Zero), filling is started only if zero setting could be carried out successfully;**
- **2: Filling is started without auto taring or zero setting (gross filling); manual tare is possible in the start step to enter the tare of not completely emptied or partially filled containers (e.g. gas bottles). For series weighings this tare weight remains stored until it is cleared or changed. Please note: the use of manual tare is not appropriate for the other two filling modes.**

Cutoff points

Weight and target are compared as absolute (unsigned) values, so it is possible to fill empty containers or to withdraw material from filled -or partially filled- ones.

Example: target weight 100.0 kg

- **fast / slow switching point at 90.0 kg (preact fast = 10 kg)**
- **cut-off slow at 98.8 kg (preact slow = 1.2 kg)**
- **S1 = 10 kg; S2 = 1.2kg (entry in Supervisor Mode)**
- **output A0 on from 0 kg to 90.0 kg;**
- **output A1 on after switching to slow speed, it remains on until 98.8 kg is reached.**

The value for S1 must be greater than that of S2. If single-speed filling is to be configured, identical values are entered for S1 and S2, the filling cycle is then controlled only via output A0.

Exchange of signals

The digital inputs E0 and E1 can be used as external Start / Interrupt signals.

After the start of a filling cycle with the Enter-key or the input signal E0, the scale is autotared and filling fast is released via the output A0. When the fast/slow switching point is reached, filling fast is switched off and filling slow is started (output A1). If the parameter 'Fast = Out0 + Out1? = Y' is chosen in the Service Mode, the signals fast and slow are output simultaneosly for filling with fast speed (e.g. to control a sliding gate with a two-stage valve).

The running filling cycle can be interrupted at any time by pressing the Enter-Key or setting the input E1. The cycle can be continued by pressing the Enter-key again or resetting the input E1, respectively.

After reaching the cut-off point, filling is stopped completely and subsequently -if applicable- the operator is prompted for the inputs in block 1 and 2 (block 1 only for the first cycle). When printout and data transmission is completed, the terminal is ready for the next filling cycle.

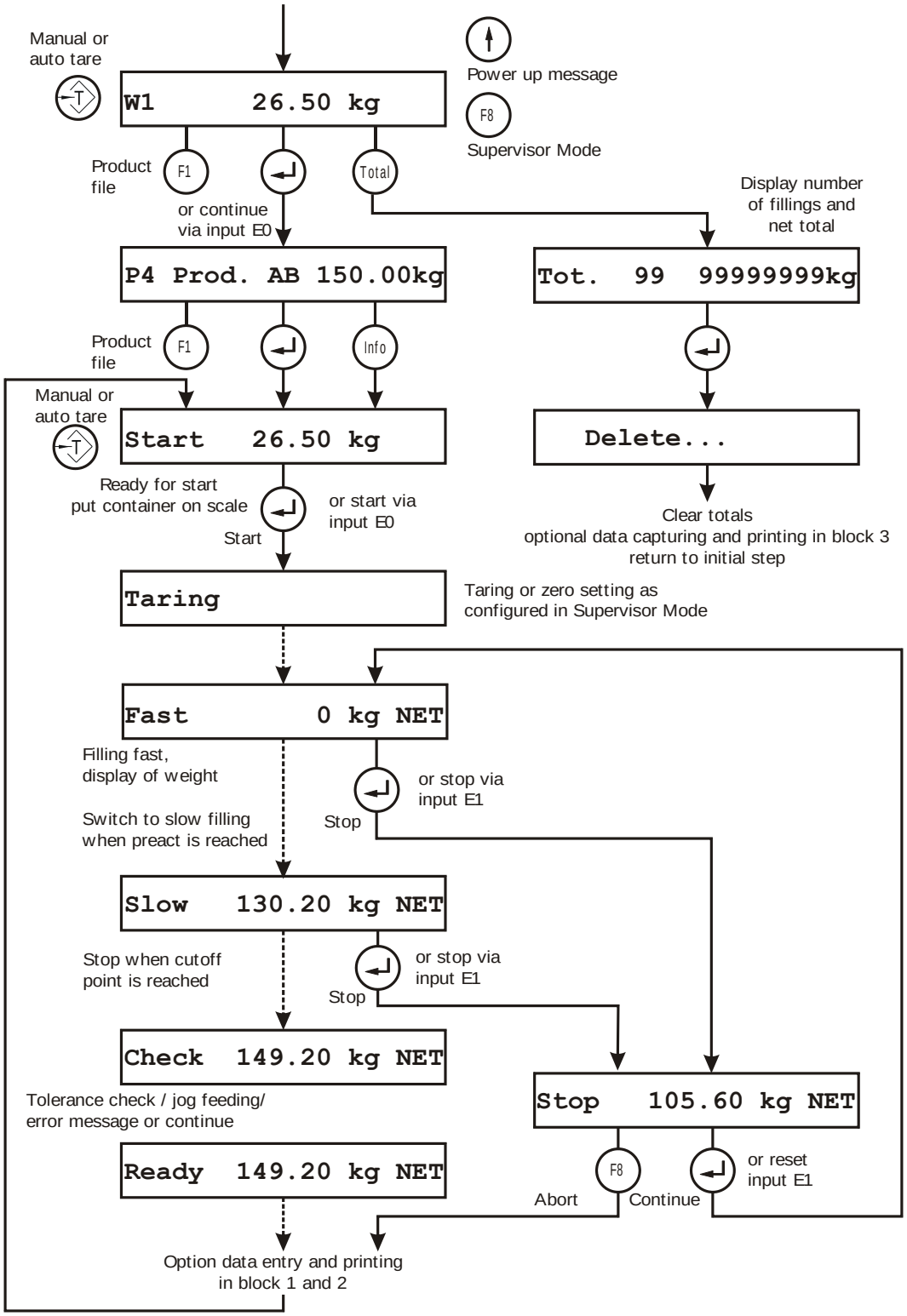
Data capturing and recording

For data capturing and recording, the net weight and the batch counter (consecutive-No. 2) can be supplemented with inputs in the header section (block 1) and the cyclic section (block 2). A printout of totals can be configured in the totals section (block 3).

After pressing the Total-key the current status of batch counter and net total is displayed for verification. If the Enter-key is pressed now, block 3 is printed and the totals are reset. If instead display of totals is exited with the Up-key, totals are retained and more filling cycles can be carried out.

13.7 Operating Mode 'Fill 2'

Principal program structure



Other than the operating mode 'Fill 1', 'Fill 2' additionally provides a product file for the storage of up to 9 materials with target weight and pertaining parameters and a tare check. Also, an automatic trend-sensing preact correction is included.

Product file

Up to 9 target weights with pertaining preacts for filling fast and slow and tolerance check can be stored in a product file against a 1-digit product-No. (1 – 9).

The product file is accessed with the F1-key, either in the basic step of the sequence or in the step with the display of the target weight.

W1 0.0 kg		**Basic step**
	F1	**Call up product file**

or:

P3 Natr.Ch. 100.0kg		**Display of selected product with target weight, (example).**
	F1	**Access product file**
P1 12345678 25.0		**Display of first record in product file (P1) with product name and target weight.**
	Info	**Choose other product (P1 - P9)**
	↵	**Enter / edit data for selected product.**
P3 Name AAAAAAAA		**Enter product name (8 characters max.)**
P3 Target 9999999		**Enter target weight.**
P3 Pre.Fast 9999999		**Enter preact fast (fast / slow switching point)**
P3 Pre.Slow 9999999		**Enter preact slow.**
P3 Settle Time 9.99		**Enter settling time before tolerance check in sec.**
P3 + Tol. 999999		**Enter permissible plus tolerance.**
P3 - Tol. 999999		**Enter permissible minus tolerance.**
P3 Jog Time[s] 9999		**Enter length of jog pulse for additional feeding after detecting minus tolerance (enter 0 to disable jog feeding); continue with next product.**
	F8	**Exit product file.**

The preact values are subtracted from the target weight to calculate the cutoff points and the outputs are reset when target minus preact fast or target minus preact slow is reached.

For the filling process the calculating sign of the weight variance is ignored, i.e. either an empty container can be filled (positive weight variance) or material can be fed out of a filled container (negative weight variance).

Preact correction

If the automatic trend-sensing preact correction (inflight compensation) is enabled (group 'Parameter' of the Supervisor Mode), the weighing terminal automatically adjusts the value for preact slow, depending on the deviation from target of the previous filling cycles. The corrected value is written into the product file. This value can also be changed manually, e.g. to shorten the learning cycle after change of raw material. Normally the controller brings the weighing result back into tolerance range after a maximum of 4 filling cycles.

Tare check

Prior to the start of a filling cycle a tare check can be carried out, i.e. filling is only released when the tare weight is greater than min. tare and smaller than max. tare. If this is not the case, an error message ('Tare not ok!') is displayed which must be acknowledged by the operator by pressing the ↵-key. After rectifying the cause of the problem, a new start signal must be set.

If no value is entered for max. tare, the tare check is disabled, e.g. for extraction of material from a filled hopper.

Exchange of signals

The digital inputs E0 and E1 can be used as external Start / Interrupt signals.

After the start of a filling cycle with the Enter-key or the input signal E0, the scale is autotared and filling fast is released via the output A0. When the fast/slow switching point is reached, filling fast is switched off and filling slow is started (output A1). If the parameter 'Fast = Out0 + Out1? = Y' is chosen in the Service Mode, the signals fast and slow are output simultaneosly for filling with fast speed (e.g. to control a sliding gate with a two-stage valve).

The running filling cycle can be interrupted at any time by pressing the Enter-Key or setting the input E1. The cycle can be continued by pressing the Enter-key again or resetting the input E1, respectively.

After reaching the cut-off point, filling is stopped completely and the tolerance is checked. If minus tolerance is detected and jog feeding enabled, filling slow is pulse-wise activated until the tolerance range is reached. An out-of-tolerance message (plus tolerance or minus tolerance with jog feeding disabled) must be acknowledged by the operator with the Enter-key. Jog feeding can be interrupted by pressing the Enter-key or setting the input E1.

After the filling is complete -if applicable- the operator is prompted for the inputs in block 1 and 2 (block 1 only for the first cycle). When printout and data transmission is completed, the terminal is ready for the next filling cycle.

Relay module with additional outputs

If an external relay module is connected, two additional outputs are available in operating mode 'Fill 2':

- **Output A2 signals a completed filling cycle. The container can then be removed from the scale. When this has happened or when a new filling cycle is started immediately, the output is reset.**
- **Output A3 signals 'Ready for start'. Start can then be released via Enter-key or input signal E0. With the start signal this output is reset.**

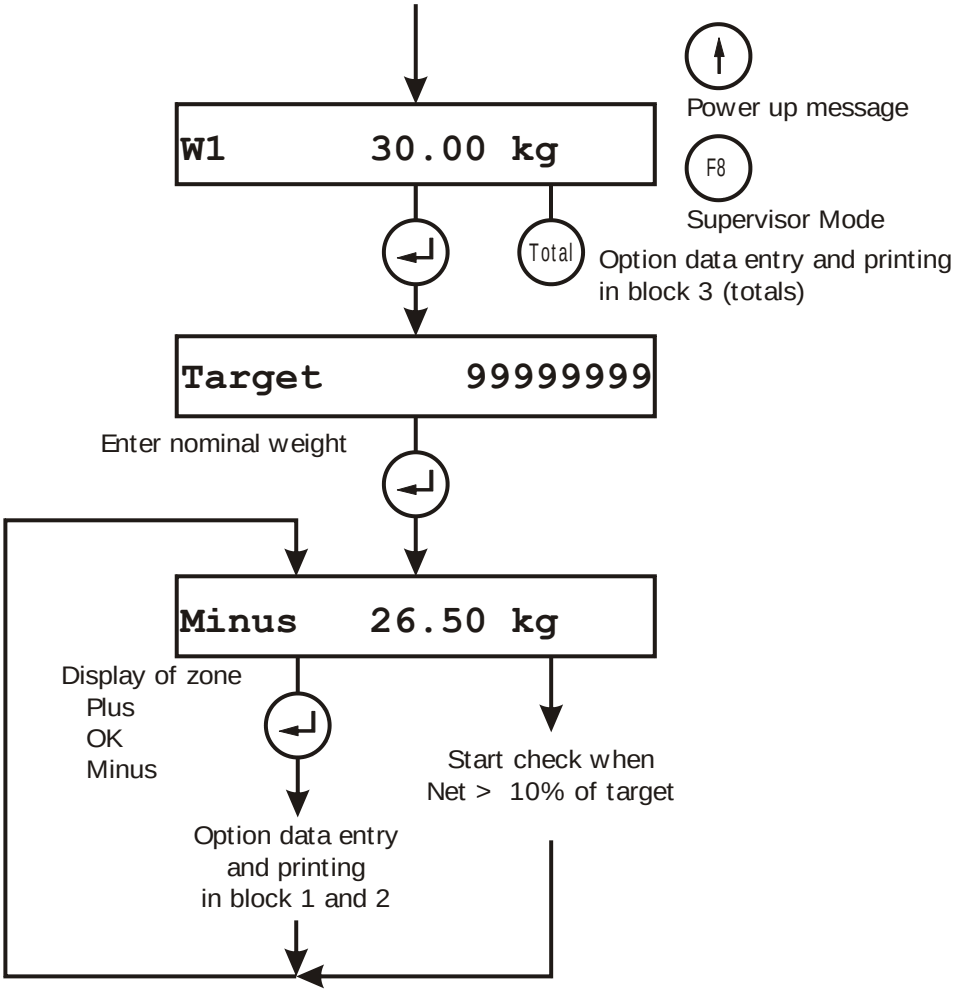
Data capturing and recording

For data capturing and recording, the net weight and the batch counter (consecutive-No. 2) can be supplemented with inputs in the header section (block 1) and the cyclic section (block 2). A printout of totals can be configured in the totals section (block 3).

After pressing the Total-key the current status of batch counter and net total is displayed for verification. If the Enter-key is pressed now, block 3 is printed and the totals are reset. If instead display of totals is exited with the Up-key, totals are retained and more filling cycles can be carried out.

13.8 Operating Mode 'Check'

Principal program structure



In the operating mode 'Check' the weighing terminal operates as a plus/minus check scale, classifying the weight of the test object in three zones (plus / ok / minus). The minus threshold is calculated as target value minus value entered for S1, while the plus threshold is target value plus S2. The output A0 indicates 'Weight ok', whereas A1 is used for the status 'Out of tolerance'. For data capturing and recording, the header section (block 1) and the cyclic section (block 2) can be configured. A printout of totals can be specified in the totals section (block 3).

In the appropriate steps of the sequence, the two inputs work in parallel to the keys:

rising edge E0	↵	**Enter**
rising edge E1	→T	**Taring**

If one of the outputs A0 or A1 (or both) is wired on the input E0, printing is automatically released (without pressing the Enter-key) after capturing the weight and classifying the test object.

A checkweighing cycle is started when the scale is loaded with more than 10% of target weight and no-motion is detected. Thereafter the output signal corresponding to the result of the check is set, and it remains on until the weight falls below the threshold of 10% of target, e.g. the test object is removed from the scale. Then the output signal is reset and a new cycle can be started.

13.9 Operating Mode 'Truck/Online'

The operating mode 'Truck/Online' combines the remote control functions of the 'Online' mode with a truck weighing program for emergency operation when the PC or the communication is down. For this reason the data transmission options in the 'Truck' part are disabled.

The initial step of the operating mode 'Online' is indicated with O1:

```
O1        25.60 kg
```

Note: The Tare-key can be enabled / disabled in the group 'General' of the Service Mode (operating mode Online only).

The operating mode 'Truck' is called up with the F8-key. Press Up-key to return from the emergency program to the 'Online' mode.

13.10 Operating Mode 'Basic/Count'

The operating mode 'Basic/Count' combines the two operating modes 'Basic' and 'Count' and is intended for mobile weighing at changing locations (e.g. goods in and warehouse). In 'Basic' mode weights and IDs can be captured and printed, whereas 'Count' permits the counting of parts for shipping and receiving.

After power up, the mode is active that was selected when the terminal was switched off, switching to the other mode and back is made with the function key F6.

`W1  25.60 kg`		**Display of gross weight in first step of sequence**
	F6	**Switch operating mode from Basic to Count**
`Appl.: Count`		**Display for approx. 3 sec, after that back to indication of gross weight**
`W1  25.60 kg`		**Anzeige Bruttogewicht im Grundschritt**
	F6	**Switch operating mode from Count to Basic**
`Appl.: Basic`		**Display for approx. 3 sec, after that back to indication of gross weight**
`W1  25.60 kg`		**Display of gross weight**
	↵	**Continue with selected operating mode**

Special charasteristics of the operating mode 'Basic/Count' versus the other modes:

- **data transmission is always disabled;**
- **when the terminal is switched from one operating mode to the other, the totals are cleared;**
- **in the configuration, block 1 is assigned to the Basic sequence, whereas block 2 is reserved for Count. Block 3 is used jointly for both operating modes.**

14 Supervisor Mode

In the Supervisor Mode parameters are entered during normal operation. From the first step of the application program (weight display) the Supervisor Mode can be called up with the F8-key.

W1 15.00kg NET		**Example for weight display in initial step**
	F8	**Call up entries (Supervisor Mode)**

Password specified for Supervisor Mode:

Password ????		**Enter password for Supervisor Mode**
Sel: Parameter	**Info**	**Select group of Supervisor Mode**
		Parameter **Weight Storage** **Logbook** **Software ID** **Mastermode**

When Supervisor Mode is exited, the entered or modified parameters are stored.

Saving...	**Exit Supervisor Mode and store changes, return to normal operation.**

14.1 Entry of Parameters

Sel: Parameter	**Entry of parameters**
Date 04.09.01	**Enter date, format as specified in Service Mode**
Time 17:15	**Enter time**

All operating modes except 'Online':

Ticket-No. 99999	**Enter / change ticket-No. (consec.-No. 1) for printout**
Consec.-No. 9999	**Enter / change consecutive-No. 2 for printout**

All operating modes except 'Fill 2':

```
1st Setpoint _______
```

Enter setpoint S1 (function depending on chosen operating mode):

- **Basic: Threshold S1, either for digital output or automatic printing after scale has settled**
- **Count: Threshold S1 for automatic taring (only when parameter 'AutoTare(G > S1) = Y' is set in Service Mode)**
- **Truck: Threshold S1 for traffic light**
- **Check: Minus tolerance**
- **Fill 1: Cutoff filling fast**

```
2nd Setpoint _______
```

Enter setpoint S2 (function depending on chosen operating mode):

- **Basic: Setpoint S2 for digital output**
- **Count: Setpoint S2 for digital output**
- **Truck: *not applicable***
- **Check: Plus tolerance**
- **Fill 1: Cutoff filling slow**

```
With Printer?       N
```

Enable / disable printer

Info or 0 / 1	**N**	**Without printer**
	Y	**With printer**

All operating modes except 'Online':

```
Transmission?       N
```

Enable / disable data transmission

Info or 0 / 1	**N**	**Without data transmission**
	Y	**With data transmission**

Operating mode 'Count' or 'Basic/Count' selected:

```
Ser.Mode?           N
```

Enable / disable serial mode in operating mode 'Count'

Y	**Serial mode on (average piece weight is stored for the next counting cycle).**
N	**Serial mode off (average piece weight is cleared and must be determined for every counting cycle).**

Operating mode 'Fill 1' or 'Fill 2' selected:

FMode(T=0/Z=1/F=2) 9			**Select tare / zero setting function that is to be carried out prior to a filling cycle**
	0	**Taring:**	**Scale is tared prior to every cycle**
	1	**Zero setting:**	**Scale is set to zero prior to every cycle**
	2	**Finish filling:**	**Filling is started without taring or zero setting (eg to finish a partial filling)**

Note: Once a selection has been made, this can only be changed after pressing the Clr-key!

Operating mode 'Fill 2' selected:

Preact Corr.? N	**Info or 0 / 1**	**Y**	**Preact correction enabled**
		N	**Preact correction disabled**
0-Range 9999999			**Enter zero range for automatic continuation after completed filling cycle and unloading of scale.**
Min.Tare 9999999			**Enter minimum tare for tare check**
Max.Tare 9999999			**Enter maximum tare for tare check, enter '0' to disable tare check.**

Operating mode 'Fill 1' or 'Fill 2' selected:

Start via Keyb.? Y		**Enable / disable start of filling cycle via keyboard.**

Password 9999		**Enter password for access to Supervisor Mode, if no password is specified, Supervisor Mode can be called up without password check.**
Saving...		**Data are saved**
Sel: Parameters	↑	**Return to basic step**

14.2 Data Archive

The data archive has a capacity of 120,000 entries. A record is stored for every completed weighing cycle in the internal W&M approved data archive consisting of weight, data and Id-No. The sequence of a weighing transaction is: operating / data entry, entry in data archive, printing and data transmission.

In the archive each record is stored with date, ident-No. and gross and net weight. The Id-No. is reset to 1 with every change of the date. To allow for a later verification of the weighing data, date and identification-No. of the weighing have to appear on the printout or must be stored together with the weight on the host computer.

The data archive can be used as an alternative to a log printer when data are processed in an EDP system. The stored weights are read-only and cannot be deleted or changed.

The data archive is supported by all operating modes except Count and Basic/Count.

14.2.1 View Stored Records

`Sel: Weight Storage`		**View data archive for verification of stored weight**
`Search Date 99.99.99`		**Enter date of weighing**
	Info	**Show data archive info (see below)**
	F5	**Print stored weights (see below)**
`IdentNo(9999)  9999`		**Show number of stored weighings for this date and enter ident-No. of weighing that is to be verified.**
`W1 99999kgN  99999 T`		**Display scale-No., net weight and tare weight; PT = Preset Tare; T = Autotare.**
	↑	**Return to previous step**
	F5	**Print record**
	↵	**Return to step** 'Search Date'

A matching record could no be found in the data archive:

`No Weight Available!`

Checksum error detected:

`Error Checksum!`	**An error was detected in the checksum of the data archive. Important note: The stored data are void!**

14.2.2 Show Data Archive Info

`Search Date 99.99.99`		
	Info	**Show info on data archive**
`Capacity  999999`		**Display capacity (number of weighing transactions that can be stored).**
	Info or ↵	**Return to step** 'Search Date'

14.2.3 Print Stored Weights

`Search Date 99.99.99`	**F5**	**Print stored weights**
`From Date 99.99.99`		**Enter start date of records to be printed**
`To Date 99.99.99`		**Enter end date of records to be printed**
`Printing...`		**Print records within selected period**
		Return to step '`Search Date`'

14.3 Logbook

All firmware updates can be traced and viewed In the logbook. It is read only and cannot be changed or deleted. A record shows the consecutive number of the update, the file name and date and time of the installation. The record at top is the most recent one.

`Sel: Logbook`		**Selection in initial step of Supervisor Mode**
`1 Update_20130222.1`	**Info**	**Next**
`installed at 2013-02`	**Info**	**Next**
`-26 15:06`		
	↵	**Continue with older record**
	↑	**Return to previous record or back to step 'Entries'.**
	F8	**Return to step** '`Sel: Logbook`'**.**

14.4 Software ID

`Sel: Software ID`	**Selection in initial step of Supervisor Mode**
`ID:15487782/V4.0.1`	**Display of identification-No. of operating system and version of approved software.**

15 Online Mode

In the operating mode 'Online' the weighing terminal is remotely controlled from a PC via serial interface #1. If operator interaction is required, the PC must send the corresponding prompts. Weighing functions from the keyboard -except for zero setting- are disabled. The marker 'O1' on the left side of the display indicates that 'Online' mode is active.

O1 30.00 kg NET	**Example for weight indication in online mode**
F8	**Exit Online mode**
→0←	**Set gross weight to zero**
W1 30.00 kg NET	**Terminal in simple weighing mode, Online mode disabled**
↵, ↑	**Return to online mode**

Note: After leaving the operating mode 'Online':
Press the keys F and 1 or F and 2 to switch from one scale to the other.

15.1 Structure Of Data Strings

Each data string from the host computer to the IT3000M at least consists of a 2-character command. Some strings may contain additional parameters and/or data. The maximum length of a string is 250 characters.

Data string PC → IT3000M:

<	*Command*	*Parameter*	*Data*	>

Data strings from the IT3000M to the host at least consist of a 2-digit error code. Depending on the command string received before, additional data may be included.

Data string IT3000M → PC:

<	*Error code*	*Data*	>	CR	LF

For a list of error codes refer to section 'Key And Error Codes'.

15.2 Overview Commands

Command	Function		Example
RN	Read settled weight, No motion		RN1
RM	Read weight immediately, also when in Motion		RM1
TA	Tare, Autotare		TA1
TM	Tare, Manual tare		TM00000.501
TC	Tare, Clear tare		TC1
SS	Select Scale		SS1
ST	Set date and Time		ST20.03.0608:10:23
SZ	Set scale to Zero		SZ1
DN	Display text, No acknowledgement		DNWait...
DA	Display text, with Acknowledgement		DAContainer on scale?
DI	Display text, wait on Input		DIArticle-No. __123
DS	Display Text for approx. 3 sec		DSReady...
RK	Return Key code of key that was pressed last		RK
SP	Set SetPoints		SP2100.5
PR	Switch on output on PRinter		PR1
	PG	Print Gross weight	PG
	PN	Print Net weight	PN
	PT	Print Tare weight	PT
GI	Get digital Input		GI
OS	Set digital Output		OS01
OC	Clear digital Outputs		OC01
RA	Read Angle of inclination		RA

15.3 Read Weights

Important note on operation with one or two scales:

Depending on the hardware configuration, IT3000M either supports 1 scale (ADM) or 2 scales (DUAL-ADM). If only one scale is connected via ADM interface, the scale-No. included in the command is ignored and the scale-No. returned in the IT3000M data string is always '1'.

If a DUAL-ADM board is installed for the connection of two scales, the *displayed* scale can be selected with the SS command and the scale-No. included in this command. However, it must be kept in mind that all other commands, implemented for compatibility reasons, which may also include a scale-No. (e.g. taring or zero setting) only have an effect on the *currently displayed scale* and do not perform an automatic switching function (regardless of the scale-No. included in the command). I.e. if scale 1 is displayed and scale 2 is to be tared, first scale 2 must be selected with the SS command before it can subsequently be tared with the TA command.

The scale-No. returned in the response string always corresponds to the number of the presently displayed scale.

RN Read Weight (no motion)

The RN command reads a settled weight.

If the scale is settled the gross, net and tare weights are returned to the host along with current date and time and ID-number. If a settled weight cannot be obtained within 6 seconds, the RN command is aborted and error code <13> is returned instead.

If the RN command could be carried out correctly, the gross, tare and net weight is formatted and stored for use with subsequent print commands (see PR command).

If a remote display is connected with traffic light function, the traffic light flag is set to 'green' after an RN command has been carried out.

Note: 'Settled' means that consecutive weight readings do not differ more than specified in the scale calibration (motion window).

Command

Field	Byte	Char's	Description	Example
RN	1	2	Command	RN
Scale-No.	2	1	Optional (see notes on operation with 2 scales)	1
	In total:	3		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table error codes	00
Scale status	3	2	First Byte: 0 = scale settled 1 = scale in motion Second Byte: 0 = gross positive 1 = gross negative	00
Date	5	8	Date (formatted as per configuration)	02.05.05
Time	13	5	Time (formatted HH:MM)	14:30
Ident-No.	18	4	Ident number (non-significant digits are transmitted as space character)	___1
Scale-No.	22	1	See note on operation with 1 or 2 scales	1
Gross weight	23	8	Formatted as per configuration (non-significant digits are transmitted as space character)	__430.00
Tare weight	31	8	Formatted as per configuration (non-significant digits are transmitted as space character)	___30.00
Net weight	39	8	Formatted as per configuration (non-significant digits are transmitted as space character)	__400.00
Unit	47	2	kg, g , t or lb, for g and t: _ = second character is space	g_
Tare code	49	2	PT = Preset Tare; _T = Autotare __ = scale not tared, (_ = space character)	PT
Weighing range	51	1	Weighing range, only for multiple range scales, otherwise space character	2
Terminal-No.	52	3	As entered in Service Mode, group 'General'	001
Check sum	55	8	CRC16 checksum (non-significant digits are transmitted as space character)	___45678

In total: 62

RM Read Weight (in motion)

The RM command returns the weight immediately after receipt, even if the scale is in motion.

The status bytes indicate whether the scale was settled or not.

If the RM command is used, the identification-No. is not increased. The identification-No. in the response data string is '0'.

Command

Field	Byte	Char's	Description	Example
RM	1	2	Command	RM
Scale-No.	3	1	Optional	1
	In total:	3		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table error codes	00
Scale status	3	2	First Byte: 0 = scale settled 1 = scale in motion Second Byte: 0 = gross positive 1 = gross negative	10
Date	5	8	Date (formatted as per configuration)	02.05.05
Time	13	5	Time (formatted HH:MM)	14:30
Ident-No.	18	4	Always 0 (non-significant digits are transmitted as space character)	___0
Scale-No	22	1	See note on operation with 1 or 2 scales	1
Gross weight	23	8	Formatted as per configuration (non-significant digits are transmitted as space character)	__430.00
Tare weight	31	8	Formatted as per configuration (non-significant digits are transmitted as space character)	___30.00
Net weight	39	8	Formatted as per configuration (non-significant digits are transmitted as space character)	__400.00
Unit	47	2	kg, g , t or lb, for g and t: _ = second character is space	g_
Tare code	49	2	PT = Preset Tare; _T = Autotare __ = scale not tared, (_ = space character)	PT
Weighing range	51	1	Weighing range, only for multiple range scales, otherwise space character	2
Terminal-No.	52	3	As entered in Service Mode, group 'General'	001
Check sum	55	8	CRC16 checksum (non-significant digits are transmitted as space character)	___45678
	In total:	62		

15.4 Taring

TA Automatic Tare

The TA command performs automatic taring.

Automatic taring is possible only if scale is settled. If no-motion cannot be detected within 6 seconds, the command is aborted and error code <15> is returned to the host. If required the host must then repeat the command.

Command

Field	Byte	Char's	Description	Example
TA	1	2	Command	TA
Scale-No.	3	1	Optional, see note on operation with 1 or 2 scales	1

In total: 3

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00

In total: 2

TM Manual Tare

The TM command is used to tare the scale with a value transferred from the host computer.

The tare value may include a decimal point or comma. The terminal rounds the tare value to the increment size of the scale. If the tare value exceeds the weighing range of the scale, error code <15> is returned to the host.

Command

Field	Byte	Char's	Description	Example
TM	1	2	Command	TM
Tare value	3	8	Including decimal point or comma	000056,71
Scale-No.	11	1	Optional, see note on operation with 1 or 2 scales	1

In total: 11

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00

In total: 2

TC Clear Tare

The tare is cleared and the scale is set to gross mode. The IT3000M always returns <00>.

Command

Field	Byte	Char's	Description	Example
TC	1	2	Command	TC
Scale-No.	3	1	Optional, see note on operation with 1 or 2 scales	1
	In total:	3		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
	In total:	2		

15.5 Select Scale

SS Select Scale

Note: This command has only an effect when a DUAL-ADM scale interface is installed for the connection of 2 scales, otherwise it is only implemented because of compatibility with existing PC programs.

Command

Field	Byte	Char's	Description	Example
SS	1	2	Command	SS
Scale-No.	3	1	Optional, see note on operation with 1 or 2 scales	1
	In total:	3		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
	In total:	2		

15.6 Set Scale To Zero

SZ Set Scale To Zero

The scale is set to gross zero. Zero setting is only possible if scale is within zero range. The IT3000M returns error code <00> when the command could be carried out correctly, if this is not the case, error code <15> is returned instead.

Command

Field	Byte	Char's	Description	Example
SZ	1	2	Command	SZ
Scale-No.	3	1	Optional, see note on operation with 1 or 2 scales	1

In total: 3

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 (if successful) or 15 (on error)	00

In total: 2

15.7 Display Of Text And Entries

DN Display Text Without Confirmation

The transmitted text string is written -left justified- into the display of the IT3000M. The terminal always returns <00>.

Command

Field	Byte	Char's	Description	Example
DN	1	2	Command	DN
Display text	3	1 - 20	1 to 20 characters max.	Wait...

In total: 3 - 22

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00

In total: 2

Notes:

- **The command <DN> without text clears the display.**
- **The DY command (bargraph display) is not implemented in the IT3000M software.**

DA Display Text With Acknowledgement

The transmitted text string is written -left justified- into the display. The terminal waits for a key to be pressed. All keys, except for the scale keys are accepted. The code of the pressed key is returned to the host (refer to 'Key And Error Codes'). Waiting on a key stroke can be aborted from the PC by sending any new command.

Command

Field	Byte	Char's	Description	Example
DA	1	2	Command	DA
Display text	3	1 - 20	1 to 20 characters max.	Drum on scale?

In total: 3 - 22

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Key code	3	1	See section 'Key And Error Codes'	a

In total: 3

DS Display Text For 3 Sec Without Acknowledgement

The transmitted text string is written -left justified- into the display of the IT3000M and shown for approx. 3 seconds. After this time has elapsed the terminal returns error code <00>.

Command

Field	Byte	Char's	Description	Example
DS	1	2	Command	DS
Display text	3	1 - 20	1 to 20 characters max.	Wait...

In total: 3 - 22

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00

In total: 2

DI Display Text With Data Input

The transmitted text string is written into the display.

Command

Field	Byte	Char's	Description	Example
DI	1	2	Command	DI
Display text	3	1 - 20	1 to 20 characters max., incl. input field specified by underline characters	Article-No. _____

In total: 3 - 22

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Text	3	1 - 20	Text field with input	Article-No. 123
Key code	23	1	See section 'Key And Error Codes'	a

In total: 3 - 23

The 20-digit text string consists of:

- **Operator prompt (1 to 19 characters, left justified).**
- **Space characters to separate prompt from entry field and entry field determined by the trailing underline characters (1 to 19 characters), e.g.** `'Article-No. _____'`.
- **When an entry is made, the underline characters are overwritten from left to right. If the entry field is to appear right justified on the display, the text string must be exactly 20 characters long, i.e. a corresponding number of space characters must be inserted between prompt and input field.**

When the entry is confirmed with the Enter-key, the modified text string is returned to the PC. The positions where the underline characters have not been overwritten are transmitted as space characters.

Examples:

Text in command string	Text in response string
0 1 2 12345678901234567890	0 1 2 12345678901234567890
Article ____	Article 123
Customer _____	Customer Smith

Confirm the entry by pressing the ↵- or ↑-key or one of the function keys F0 to F9, Total, Info, Taring or Set Zero. The Clr-key is used for editing and cannot be used as confirmation (see also chapter 'Key And Error Codes'. The modified text string and the confirmation key are returned to the host.

Those positions in the data string, where underline characters were not overwritten, are returned as space characters, e.g. `'Artikcle-No. 1234 '`.

Waiting on a key stroke can be aborted from the PC by sending any new command.

ST Set Date And Time

Command

Field	Byte	Char's	Description	Example
ST	1	2	Command	ST
Date	3	8	TT.MM.JJ	20.03.06
Time	11	8	HH:MM:SS	08:10:23

In total: 19

Response

Field	Byte	Char's	Description	Example
Error code	1	2	always 00	00

In total: 2

RK Read Key Code Of Last-Pressed Key

Returns the code of the last-pressed key.

Command

Field	Byte	Char's	Description	Example
RK	1	2	Command	RK

In total: 2

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Key code	3	1	See section 'Key And Error Codes'	a

In total: 3

Note: If no key was pressed, a space character (20hex) is returned.

SP Set Setpoints

Sets the value for setpoint 1 or 2.

Command

Field	Byte	Char's	Description	Example
SP	1	2	Command	SP
Setpoint	3	1	1 or 2	2
Value	4	1 - 7	Including decimal point or comma, example: SP2100.5 sets setpoint 2 to 100.5	100.5

In total: 4 - 10

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00

In total: 2

15.8 Printing

PR Enable/Disable Printer

The PR command is used to enable the printer. All subsequently received data from the host computer are output on the printer. Thus, an individually formatted ticket or form can be printed. By means of the commands <PG>, <PN> and <PT> (see below) W&M approved weight values can be included in the printout. The <PR0> command terminates the printing. The IT3000M always returns <00>.

Command

Field	Byte	Char's	Description	Example
PR	1	2	Command	PR
Printer-No.	3	1	Always '1' for IT3000M, send printer-No. 0 to terminate output.	1
	In total:	3		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
	In total:	2		

PG, PN, PT Print Weight Values (W&M Approved Applications)

By means of the <PG> command, the gross weight read with the latest <RN> command is printed. The <PN> and <PT> commands provide printing of the net and tare value, respectively.

The printer must be enabled with the <PR1> command before <PG>, <PN> or <PT> commands are accepted.

Example for printout of weighticket:

Host → IT3000M	IT3000M → Host	
<RN>	Weight Data	Read no-motion weight
<PR1>	<00>	Enable printer
Gross: <PG> Net: <PN> Tare: <PT>	(no response)	Print weights
<PR0>	<00>	Disable printer

15.9 Read / Set Digital I/Os

GI Read Digital Inputs

The GI command reads the status of the digital inputs of the IT3000M terminal.

Command

Field	Byte	Char's	Description	Example
GI	1	2	Command	GI
Input-No.	3	2	Number of input that is to be read, 01 = input 1 (IN0) 02 = input 2 (IN1) 00 = read both inputs.	01
	In total	4		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Status	3	1 - 2	1- or 2-digit ASCII string, consisting of 0 and 1 (0 = Off, 1 = On) Examples: 1 Input IN0 On, in response to command GI01 to read input E1 01 Input IN0 Off, Input IN1 On, in response to command GI00 to read both inputs	1
	In total	3 - 4		

Note: To read the two digital inputs, an optional PIM module must be installed.

OS Set Digital Outputs

The OS command sets the specified output. The IT3000M always returns <00>.

Command

Field	Byte	Char's	Description	Example
OS	1	2	Command	OS
Output-No.	3	2	Number of output that is to be set, 01 = Output 1 (OUT0) 02 = Output 2 (OUT1)	01
		4		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
		2		

Notes:

- To set digital outputs, an optional PIM module must be installed.
- In the Technical Manual and the schematics the outputs are referred to as OUT0 and OUT1. Thus, the command <OS01> sets output OUT0 and <OS02> sets OUT1.
- Only one output can be set at a time.

OC Clear Outputs

The OC command resets the specified output (off). If '00' is sent, both outputs are reset. The IT3000M always returns <00>.

Command

Field	Byte	Char's	Description	Example
OC	1	2	Command	OC
Output-No.	3	2	Number of output that is to be reset, 01 = Output 1 (OUT0) 02 = Output 2 (OUT1)	01
	In total:	4		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
	In total:	2		

Note:

- To set/reset digital outputs, an optional PIM module must be installed.
- In the Technical Manual and the schematics the outputs are referred to as OUT0 and OUT1. Thus, the command <OC01> resets output OUT0 and <OC02> resets OUT1.

15.10 Read Angle Of Inclination

RA Read Angle Of Inclination

The RA command returns the current angle of inclination of the X- and Y- axis.

Command

Field	Byte	Char's	Description	Example
RA	1	2	Command	RA
	In total:	2		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Angle of inclination (X- axis)	3	8	Current angle of inclination of X-axis (non-significant digits are transmitted as space character)	___20.50
Angle of inclination (Y- axis)	11	8	Current angle of inclination of Y-axis (non-significant digits are transmitted as space character)	___10.25
	In total:	18		

GB Read Battery Voltage

The GB command returns the current battery voltage in percent and volt.

Command

Field	Byte	Char's	Description	Example
GB	1	2	Command	GB
	In total:	2		

Response

Field	Byte	Char's	Description	Example
Error code	1	2	00 = no error, see table of error codes	00
Battery voltage	3	3	Current battery voltage in percent (non-significant digits are transmitted as space character)	_87
Battery voltage	6	7	Current battery voltage in V (non-significant digits are transmitted as space character)	_27.957
	In total:	13		

15.11 Key And Error Codes

The following table shows the keys -and their corresponding key codes- the operator may use to acknowledge a text message transmitted with a <DA> command. Data entries prompted for by a <DI> command can only be confirmed with the keys ↵ , ↑, Info, ← and the function keys F1 to F8.

The key code of the pressed key is returned in the response data string.

Key on IT3000M terminal	Key code hexadecimal	Key code decimal	Available in DA command	Available in DI command
Enter key ↵	C9	201	Yes	Yes
Back key ↑	C8	200	Yes	Yes
Function keys F0 to F8	F0 - F8	240 - 248	Yes	Yes
Function key F9	FC	252	Yes	Yes
Info key	F9	249	Yes	Yes
Clr key	C0	192	Yes	No *)
Total key	FB	251	Yes	Yes
Zero key	C3	195	Yes	Yes
Tare key	C4	196	Yes	Yes
Numeric keys 0 - 9	30 - 39	48 - 57	Yes	No *)
. key	2E	46	Yes	No *)
– key	2D	45	Yes	No *)

*) These keys are used for *editing* an input field and cannot be used for *confirmation* of a DI command.

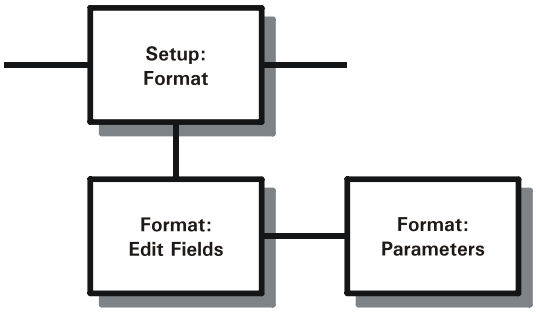
The following table shows the list of error codes that are returned by IT3000M in the case of an error. Code 00 indicates that no error has been detected.

Error-No.	Description
00	No error
11	General scale error (e.g. no connection to loadcell)
12	Scale overload (maximum weighing range exceeded)
13	Scale in motion (not settled after 6 seconds)
14	Scale not available (e.g. DUAL-ADM installed, but only one scale configured)
15	Error taring or zero setting (e.g. wrong tare format)
16	Printer not ready (offline)
17	Invalid printer command
18	Zero setting error (out of zero range, scale in motion)
20	Scale in underload
31	Transmission error (e.g. data string too long or timeout)
32	Invalid command
33	Invalid parameter

16 Setup: Format (Configuration Of Print Format)

With the print format generator up to 61 print fields in up to 3 blocks can be defined and placed freely on a printout. By assigning appropriate attributes to the individual fields, also an operating sequence consisting of header, cyclic part and totals, with entries and calculations can be generated. The predefined basic application routines (operating modes), except 'Online' (see group 'General'), can be supplemented in this way. The position of a field on the printout is defined by specifying its line and column number. With the PC program RTC *CONFIGURATOR*, definition of printouts and configuration of sequences are possible in a very convenient way, but all functions are also accessible via keyboard and display of the weighing terminal (except for special characters not available on the terminal's keyboard).

Choose group 'Setup: Format' from Service menu.



16.1 Format: Edit Fields

`Setup: Format`		**Configure print and input fields**
`Format: Edit Fields`		
`Field-No. 1`		**Start with field 1**
	↑	**Return to step** '`Format`'
	Clr	**Clear displayed field-No. and enter new one**
`F01: Block 1`	**Info**	**Select partial sequence for the field:** **Block 1 = header *)** **Block 2 = cyclic part *)** **Block 3 = totals** **Not Used = field is not used** **On entry 'Not Used' continue with next field**

***) In the operating modes 'Truck' and 'Truck/Online' the sequence in block 1 is used for the first weighing and block 2 for the second weighing, while block 3 can be configured for a simple test print. In the combined operating mode 'Basic/Count', block 1 is assigned to the Basic sequence, whereas block 2 is reserved for Count, block 3 is used as totals part for both.**

`F01: Line No. 999`		**Enter line-No. of print field**
	Clr	**Clear displayed line-No. and enter new one**
`F01: Column No. 999`		**Enter column-No. of print field**
	Clr	**Clear displayed column-No. and enter new one**

F01: No Attribute

Info **Select print attribute for the print field:**

Bold
Underlined
Expanded
Condensed
Italic
Special 1 = **attribute as defined with S1 On/Off**
Special 2 = **attribute as defined with S2 On/Off**
No Attribute

Note: The print attributes Bold to Italic are output in compliance with the ESC/P® standard and must be supported by the connected printer. The attributes Special 1 and 2 can be defined as control sequence with a maximum of 4 successive ASCII codes in group 'Interface', settings for COM2.

F01: Fetch

Info **Select how the field is to be generated:**

Fetch = **system variable**
Input = **operator entry**
Calculate = **arithmetical operation**
Text = **predefined or entered text**

16.1.1 Field Fetch

```
F01: Date
```

Info **Use system variable as field:**

Date		
Time		
Consec.-No.1	***)**	
Consec.-No.2	***)**	
Gross		
Tare		
Net		
Total gross		
Total tare		
Total net		
Unit	**unit sign of calibration (kg, t)**	
Av.Piece Wgt	**average piece weight**	**(Count)**
Count	**number of pieces**	**(Count)**
Total Count	**total number of pieces**	**(Count)**
1st Weight ID	**first weight ID in memory**	**(Truck)**
Target	**target weight for filling**	**(Fill)**
Ref. parts	**number of reference parts**	**(Count)**
Alibi-No.	**ident-No. of record in data archive**	
ScaleNo	**scale-No.**	****)**
Product	**product name**	
1st wgt. date	**first weight date**	**(Truck)**
1st wgt. time	**first weight time**	**(Truck)**
1st alibi No.	**first weight ident-No. of record in data archive**	**(Truck)**
1st weight	**first weight**	**(Truck)**

***)** **In the operating mode 'Truck', the consecutive-No.2 (4 digits) is increased by 1 with every first or second weighing (number of weighing). Consecutive-No. 1 (5 digits) is increased by 1 with every completed second weighing and can thus be used as number of ticket.**

In all other operating modes, consecutice-No. 2 is increased by 1 with every weighing in the cyclic part (block 2). If a total sequence (block 3) is defined, consecutive-No. 2 is reset to 1 again after this block has been carried out. Consecutive-No. 1 (5 digits) is increased by 1 only after carrying out block 3 (if that is defined).

****)** **With an ADM scale interface installed, the scale-No. is always 1. When a DUAL-ADM board is used, the scale-No. corresponds to the presently displayed scale (1 or 2). The scale-No. of an optional reference scale (Count) cannot be read.**

16.1.2 Field Input

F01: Date	Info	Select prompt from text table:

Date	Time	Ticket-No.
Cons.-No.	Gross	Tare
Net	Total	Parts
Pc.Wgt(g)	Product	V-Reg.-No.
First Weight	Second Weight	Client
Vehicle		

F1 Furthermore up to 10 entries may be added to the text table (lenght max. 20 characters each, max. 100 characters in total). Use F1-key at the end of list to call up entry. This text table is used for both, operator prompts for entries and print fields.

F01: String Type	Info	Select data type of entry: String = alphanumeric text Number = numeric value only
F01: No.Of Char. 99		Specify length of entry String max. 9 Number max. 16

Only for type 'Number':

F01: Fix Dec.Pt.=0	Info	Select position of decimal separator: 0 - 4 entry with 0 - 4 trailing decimals *)
F01: Sto.A.Print	Info	Select whether entry is to be stored -or not- after printout has been completed: Sto.After Print = store after print for the next cycle Del.After Print = delete after print

*) If an entry contains a decimal separator, it is counted as one digit that must be considered when the length is specified. Example: a numeric entry with 6 digits and two trailing decimals is represented internally and transmitted as '999.99'.

16.1.3 Field Calculate

Generate field through arthmetical operation on two operands.

```
F01  1st Operand  99
```

Enter field-No. of first operand:

1 - 61 **field 1 - 61**

Clr **Clear displayed field-No. and enter new one**

```
F01: 2nd Operand  99
```

Enter field-No. of second operand:

1 - 61 **field 1 - 61**
62 **factor 1**
63 **factor 2**

Contents of fields 62/63 as entered under 'Format: Parameters\Factor 1/2'.

Clr **Clear displayed field-No. and enter new one**

```
F01: Add
```

Select how the two operands are to be linked:

Add = add operand 2 to operand 1
Sub = subtract operand 2 from operand 1
Mul = multiply operand 1 with operand 2
Div = divide operand 1 by operand 2
% = calculate [operand 2] percent of [operand 1]

```
F01: No.Of Char   99
```

Enter number of digits for the result;

Valid entries: 1 - 16

```
F01: Fix Dec.Pt.=9
```

Info **Select position of decimal separator:**

0 - 4 format result with 0 - 4 trailing decimals

16.1.4 Field Text

```
F01: Text
```

Info **Select prompt from text table:**

Date	**Time**	**Ticket-No.**
Cons.-No.	**Gross**	**Tare**
Net	**Total**	**Parts**
Pc.Wgt(g)	**Product**	**V-Reg.-No.**
First Weight	**Second Weight**	**Client**
Vehicle		

After 'Vehicle' additional texts can be entered or edited:

F1 **Up to 10 texts may be added to the table (lenght max. 20 characters each, max. 100 characters in total).**

The text table is used for both, operator prompts for entries and print fields.

For examples of print formats, please refer to chapter 'Configuration Examples'.

16.2 Format: Parameters

Config: Format		
Format: Parameters	Info	Configure print parameters
Tabulator: ESC/P	Info	Select method to output tab function on printer: Tab = ESC/P Tab function as per ESC/P® protocol Tab = Spaces Tab function by sending space characters
S1 On _		Control sequence for print attribute S1 On; Enter ASCII code for control sequence, separate subsequent codes (4 max.) by hyphens, (example: 27–69–48)
S1 Off _		Control sequence for print attribute S1 Off
S2 On _		Control sequence for print attribute S2 On
S2 Off _		Control sequence for print attribute S2 Off
Formfeed Char 999		Enter control character to terminate block 3; examples: formfeed = 012 no output = 000 S2 off = 127
Factor 1 0.0000		Optional entry of a constant (field 62), that can be used as factor 1 in calculations (e.g. kg / lb conversion).
Factor 2 0.0000		Optional entry of a constant (field 63), that can be used as factor 2 in calculations.

Please note (1): In the operating mode 'TRUCK' (and the offline mode of 'TRUCK ONLINE'), the print cycles for first and second weight (block 1 and 2) are normally terminated with a formfeed, as is required for printing on weightickets. Test print in block 3 is always made without formfeed. If the parameter 'Formfeed Char' is set to zero, the transmission of a formfeed character is also omitted in block 1 and 2, enabling printing on endless paper.

In the operating mode 'BASIC/COUNT' the entered formfeed character is output for all three blocks.

In all other operating modes, the parameter 'Formfeed Char' takes effect only for printing in block 3 (totals).

Hence, formfeed characters are output in the individual operating modes as follows:

	BASIC COUNT CHECK FILL	TRUCK TRUCK ONLINE	BASIC/COUNT
Block 1	—	as entered	as entered
Block 2	—	as entered	as entered
Block 3	as entered	—	as entered

Please note (2): By specifying a special control character the assignment shown above can be changed as follows:

Control character 'Formfeed Char 127'

The attribute 'S 2 off' is output to terminate printing of *each* block.

Control character 'Formfeed Char 126'

The attribute 'S 2 off' is output *only* to terminate printing of block 3. For the other blocks (1 and 2) no control character is sent.

Example: paper handling for model TMU-295 printer; for this purpose the print attributes S1 and S2 must be entered as follows:

Print attribute	ASCII sequence	Function
S1 On	27—99—52	no printing without paper
S1 Off	—	
S2 On	—	
S2 Off	27—113	release paper

I.e. when control character 127 is specified, the ticket can be removed from the printer after the printing of each block (and must be inserted and / or positioned for every new printout), while control character 126 determines that the paper is only released after printout of block 3 is complete. The print attribute 'S1 On' must be assigned to the first field of a block to activate the paper sensor.

17 Examples Of Print Formats

17.1 Example 'Basic'

Let us start with a very simple example: operating mode 'Basic' with printout of date, time, gross, tare and net weight on a strip printer, no additional IDs. Our recommendation is always to start the layout with paper and pencil. The typical grid pattern is 10 characters per inch in width, and 6 lines per inch in length. Appropriate forms can be found further down in this manual.

```
          1         2         3         4
 12345678901234567890123456789012345678901

1 Date/Time  05.10.01/10:20
2 Gross           136.0kg
3 Tare            100.0kgPT
4 Net              36.0kgC
```

This printout consists of 12 fields, that are defined as follows:

Field-No.	Block	Line	Column	Attribute	Source	Content
1	2	1	1	No Attribute	Text	Date
2	2	1	6	No Attribute	Text	/
3	2	1	7	No Attribute	Text	Date
4	2	1	12	No Attribute	Fetch	Date
5	2	1	20	No Attribute	Text	/
6	2	1	21	No Attribute	Fetch	Time
7	2	2	1	No Attribute	Text	Gross
8	2	2	14	No Attribute	Fetch	Gross
9	2	3	1	No Attribute	Text	Tare
10	2	3	14	No Attribute	Fetch	Tare
11	2	4	1	No Attribute	Text	Net
12	2	4	14	No Attribute	Fetch	Net

Explanation:

All fields on the printout are positioned by specifying the line- and the column-No. of the *left-most* character in the string that is to be output. For field 1 with the text 'Date' that can be easily recognized, line 1 / column 1 points to the 'D' in 'Date'.

For field 8 (gross weight of scale) that is already a little more difficult to spot, it must be taken into consideration that weight values are internally represented as an 8-character string and that leading zeros are suppressed. Thus the output of the gross weight indeed starts in column 14, although the first character appears in column 17.

A similar effect applies to the unit sign that is automatically appended to the weight value. For gross weights the unit sign has always a length of 2 characters (e.g. 'kg'), for tare weights the length is 4 characters (e.g. 'kgPT' for manual tare), while the length for the net weight sign is 3 characters long (e.g.'kgC' for calculated net weights). If fewer characters are required for the correct representation of the unit sign (e.g. 't' or 'kg' for autotared tare weights), the gap is filled with a corresponding number of space characters. When a printout is drafted, the actual length of all variables must be considered and overlapping avoided, or -depending on the type of printer- some very strange effects may appear.

The fields 1 (Date), 3 (Time), 7 (Gross), 9 (Tare) and 11 (Net) are chosen from the existing text table, field 2 -stroke- (/) is entered as an additional text field, that can also be used in field 5. With a little more experience it is certainly possible to combine the fields 1, 2, 3 to one field with the text 'Date/Time'. This is the recommended approach for more complex applications coming close to the limit of 61 fields in total. It is not mandatory to number the fields in rising order without gaps (although this usually helps to structure one's own work). Fields may remain free by assigning the 'not used' attribute.

Our sequence uses the cyclic part only, and does not have a header or totals section, hence all fields are in block 2.

Extensions:

Expanded printing of net weight:

```
          1         2         3         4
12345678901234567890123456789012345678901

1  Date/Time  05.10.01/10:35
2  Gross           136.0kg
3  Tare             21.0kgPT
4  Net        1 1 5 . 0 k g C
```

To this effect the print attribute 'Expand' must be assigned to the field 12:

Field-No.	Block	Line	Column	Attribute	Source	Content
12	2	4	6	Expanded	Fetch	Net

The field has been moved to column 6, since the printout now requires twice as much space as before (of course you can leave the print position as is, the printout is then shifted to the right).

Addition of consecutive number:

```
          1         2         3         4
12345678901234567890123456789012345678901

1  Date/Time  05.10.01/10:35 Cons.-No.    1
2  Gross           136.0kg
3  Tare             21.0kgPT
4  Net        1 1 5 . 0 k g C
```

Addition of 2 fields for the text and the consecutive-No.:

Field-No.	Block	Line	Column	Attribute	Source	Content
13	2	1	27	No Attribute	Text	Cons.-No.
14	2	1	37	No Attribute	Fetch	Consec.-No.2

Please note that it is possible at any time to add fields at any position in the printout (here: field 13 and 14 between the existing fields 6 and 7). One restriction applies to fields that are also used for data entries. Inputs are made following the rising order of field-Nos. within a block.

The system variable 'Consec.-No.2' has 4 digits. When it is printed, leading zeros are suppressed. The consecutive-No. 2 can be preset to any value in the Supervisor Mode, and it is increased by 1 with every completed cycle in block 2. If a totals section (block 3) is configured, Consec.-No 2 is reset to 1 after this block has been carried out. Consec.-No. 1 can also be preset in the Supervisor Mode, however its value is only increased by 1 after carrying out block 3 - if there is any. Through this differentiation it is possible, for instance, to use 'Consec.-No. 2' as a counter for individual items on a shipping note, whereas 'Consec.-No. 1' serves as ticket-No.

Addition of empty lines:

In our present configuration, the first line for the second cycle is printed under the last line of the first cycle. In many cases, however it is desired to separate the individual printouts by inserting a number of blank lines, in the example below 2 empty lines.

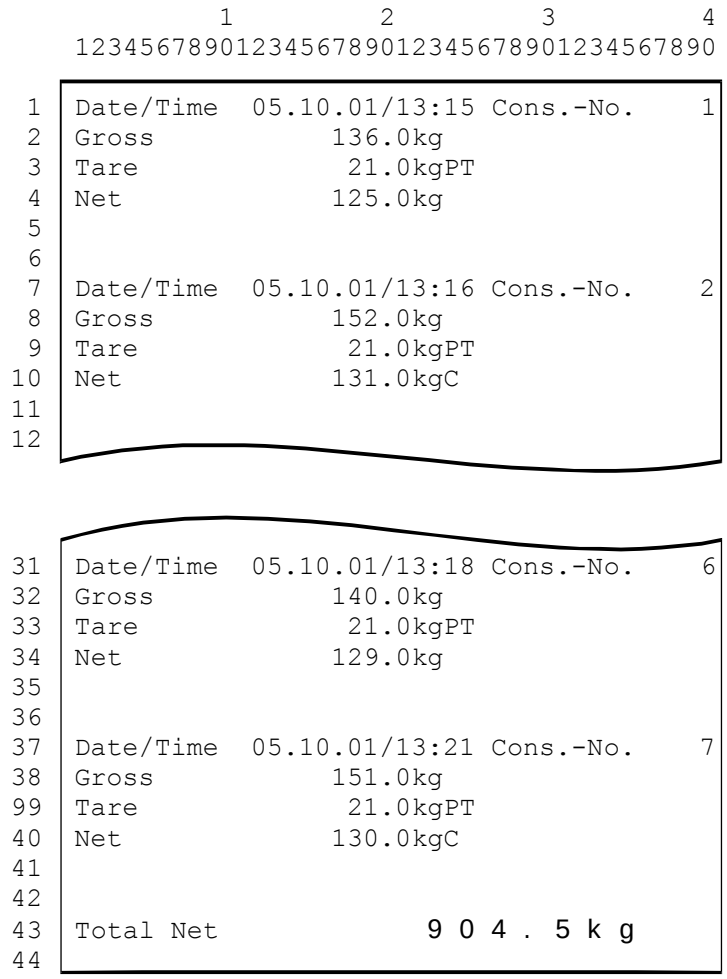
```
          1         2         3         4
12345678901234567890123456789012345678901234567890

 1 Date/Time  05.10.01/12:45 Cons.-No. 4531
 2 Gross           136.0kg
 3 Tare             21.0kgPT
 4 Net        1 1 5 . 0 k g C
 5
 6
 7 Date/Time  05.10.01/12:46 Cons.-No. 4532
 8 Gross           152.0kg
 9 Tare             21.0kgPT
10 Net        1 3 1 . 0 k g C
11
12
```

To insert two blank lines, a new field is configured to output a space character in line 6. This has the effect of two blank lines (5 and 6) and the next printout is started in line 7.

Field-No.	Block	Line	Column	Attribute	Source	Content
15	2	6	1	No Attribute	Text	(<Space>)

Calculation and printout of totals:

As a further extension we now want to calculate the total net weight over a number of weighings and print it after pressing the Total-key. For improved readability, we change the print of the net weight back to normal width and print only the total net weight in double width. Here we must keep in mind that the system variables for totals have a length of 10 characters, i.e. unless we want to reconfigure the whole printout, we must shift the net total to the right. Also the unit sign for weight totals is automatically appended (e.g. 'kg'), it has always a length of two characters.



Field-No.	Block	Line	Column	Attribute	Source	Content
16	**3**	**1**	**1**	**No Attribute**	**Text**	**Total Net**
17	**3**	**1**	**13**	**Expanded**	**Fetch**	**Total Net**
18	**3**	**3**	**1**	**No Attribute**	**Text**	**(<Space>)**

With field Feld 16 the entered text 'Total Net' ist printed, field 17 prints the accumulated net weight (starting in column 13), and field 18 again generates two blank lines. After that the totals memory is cleared, consecutive-No. 2 reset to 1, and a new cycle can be started.

Print of a heading:

In the next step we will configure a headline, containing an article-No., a customer-No. and a ticket-No. This requires two input fields in the sequence (up to now, we do not have any inputs yet), which we want to configure in such a way that the customer-No. remains stored after print of total, whereas the article-No. is cleared and must be entered anew.

```
          1         2         3         4
12345678901234567890123456789012345678901

 1  Customer 4728 Article A3761 Ticket 10001
 2
 3
 4  Date/Time  05.10.01/13:15 Cons.-No.    1
 5  Gross          136.0kg
 6  Tare             21.0kgPT
 7  Net             125.0kgC
 8
 9
10  Date/Time  05.10.01/13:16 Cons.-No.    2
11  Gross          152.0kg
12  Tare             21.0kgPT
13  Net             131.0kgC

34  Date/Time  05.10.01/13:18 Cons.-No.    6
35  Gross          140.0kg
36  Tara             21.0kgPT
37  Net             129.0kgC
38
39
40  Date/Time  05.10.01/13:21 Cons.-No.    7
41  Gross          151.0kg
42  Tare             21.0kgPT
43  Net             130.0kgC
44
45
46  Total Net             9 0 4 . 5 k g
47
48
49  Customer 4728 Article B2435 Ticket 10002
50
51
52  Date/Time  05.10.01/13:25 Cons.-No.    1
53  Gross          124.0kg
```

The fields 19, 21 and 23 are text fields for the printout. Fields 19 and 21 are also used as operator prompts for the entries. Field 20 is configured as 'numerical, 4 digits, no trailing decimals, store after print', the corresponding assignment for field 22 is 'string, 5 characters, clear after print'. By assigning the property 'String', entry of alpha characters is enabled, although it is not recommended to use alpha characters for frequently requested entries. Field 25 serves to generate 2 blank lines by outputting a space character.

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
19	1	1	1	No Attribute	Text	Customer	–
20	1	1	7	No Attribute	Input	9999	Customer
21	1	1	14	No Attribute	Text	Article	–
22	1	1	22	No Attribute	Input	XXXXX	Article
23	1	1	30	No Attribute	Text	Ticket	–
24	1	1	36	No Attribute	Fetch	Consec.No1	–
25	1	3	1	No Attribute	Text	(<Space>)	–

Sequence and printout fully comply with the requirements, although our approach was not a 'monolithic' one, instead we have tinkered around a bit and added piece by piece. Consolidated, and configured in the sequence that you would normally use, our application looks as shown below. As a further extension, entry of a price / Eur in block 1 and the calculation of amount, VAT and total amount in block 3 were added.

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
1	1	1	1	No Attribute	Text	Customer	–
2	1	1	10	No Attribute	Input	9999	Customer
3	1	1	15	No Attribute	Text	Article	–
4	1	1	23	No Attribute	Input	XXXXX	Article
5	1	1	29	No Attribute	Text	Ticket	–
6	1	1	36	No Attribute	Fetch	Consec.-No.1	–
7	1	2	1	No Attribute	Text	Price/kg Eur	–
8	1	2	14	No Attribute	Input	99,99 (5,2)	Price/kg Eur
9	1	4	1	No Attribute	Text	(<Space>)	–
10	2	1	1	No Attribute	Text	Date/Time	–
11	2	1	12	No Attribute	Fetch	Date	–
12	2	1	20	No Attribute	Text	/	–
13	2	1	21	No Attribute	Fetch	Time	–
14	2	2	1	No Attribute	Text	Gross	–
15	2	2	14	No Attribute	Fetch	Gross	–
16	2	3	1	No Attribute	Text	Tare	–
17	2	3	14	No Attribute	Fetch	Tare	–
18	2	4	1	No Attribute	Text	Net	–
19	2	4	14	No Attribute	Fetch	Net	–
20	2	1	27	No Attribute	Text	Cons.-No.	–
21	2	1	37	No Attribute	Fetch	Consec.-No.2	–
22	2	6	1	No Attribute	Text	(<Space>)	–
23	3	1	1	No Attribute	Text	Total	–
24	3	1	13	Expanded	Fetch	Total Net	–
25	3	2	1	No Attribute	Text	Amount Eur	–
26	3	2	14	No Attribute	Calculate	F24 x F08 (8,2)	–
27	3	3	1	No Attribute	Text	VAT 19% Eur	–
28	3	3	14	No Attribute	Calculate	F26 x F33 (8,2)	–
29	3	4	1	No Attribute	Text	Tot.Amount Eur	–
30	3	4	14	No Attribute	Calculate	F26 + F28 (8,2)	–
31	3	6	1	No Attribute	Text	(<Space>)	–
32	N/U						
:							
61	N/U						
62	–	–	–	No Attribute	–	0.19	–
63	N/U						

Calculations are performed in fields 26, 28 and 30. The VAT rate is entered as constant in field 33 (entry in Service Mode, group 'General').

The complete printout looks then as follows:

```
          1         2         3         4
12345678901234567890123456789012345678901234567890

 1  Customer 4728 Article A3761 Ticket 10001
 2  Price/kg Eur 13.25
 3
 4
 5  Date/Time  05.10.01/13:15 Cons.-No.    1
 6  Gross           136.0kg
 7  Tare             21.0kgPT
 8  Net             125.0kgC
 9
10
11  Date/Time  05.10.01/13:16 Cons.-No.    2
12  Gross           152.0kg
13  Tare             21.0kgPT
14  Net             131.0kgC

35  Date/Time  05.10.01/13:18 Cons.-No.    6
36  Gross           140.0kg
37  Tar              21.0kgPT
38  Net             129.0kgC
39
40
41  Date/Time  05.10.01/13:21 Cons.-No.    7
42  Gross           151.0kg
43  Tare             21.0kgPT
44  Net             130.0kgC
45
46
47  Total                 9 0 4 . 5 k g
48  Amount     Eur  11984.63
49  VAT  16%   Eur   1917.54
50  Tot.Amount Eur  13902.17
51
52
53  Customer 4728 Article B2435 Ticket 10002
54  Price/kg Eur  3.50
55
56
57  Date/Time  05.10.01/13:35 Cons.-No.    1
```

Our example quite clearly illustrates the possibilities of sequence and printout configuration, but also its limitations. This example uses 31 out of 61 fields and all 10 texts that can entered. So you cannot expect much more.-

17.2 Example 'Count'

The following example generates a typical printout for a parts counting operation in serial mode for identical parts. The printout consists of a header with date, time, an operator entered article-No. and the determined average piece weight. In block 2 (the cyclic part), a line is printed for every weighing cycle with consecutive-No. and number of pieces. Finally in block 3 (totals section), the total of all captured pieces is printed.

```
          1         2         3         4
12345678901234567890123456789012345678901234567890

 1  Date/Time      05.10.01 12:45
 2  Article-No.    123456
 3  Piece Wgt.(g)    14.898 g
 4
 5     1              159 Pieces
 6     2              149 Pieces
 7     3              144 Pieces
 8
 9  Total             452 Pieces
10
```

The printout consists of 16 fields which are generated as follows:

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
1	1	1	1	No Attribute	Text	Date/Time	–
2	1	1	16	No Attribute	Fetch	Date	–
3	1	1	24	No Attribute	Text	/	–
4	1	1	25	No Attribute	Fetch	Time	–
5	1	2	1	No Attribute	Text	Article-No.	–
6	1	2	16	No Attribute	Input	999999	Article-No.
7	1	3	1	No Attribute	Text	Piece Wgt (g)	–
8	1	3	16	No Attribute	Fetch	Av.Piece Wgt	–
9	1	3	26	No Attribute	Text	g	–
10	1	4	1	No Attribute	Text	(<Space>)	–
11	2	1	1	No Attribute	Fetch	Consec.-No.2	–
12	2	1	14	No Attribute	Fetch	Count	–
13	2	1	23	No Attribute	Text	Pieces	–
14	3	2	1	No Attribute	Text	Total	–
15	3	2	12	No Attribute	Fetch	Total Count	–
16	3	2	23	No Attribute	Text	Pieces	–
17	3	4	1	No Attribute	Text	(<Space>)	–

The blank line between block 2 and block 3 is inserted by simply starting the printout of the totals in line 2.

17.3 Example 'Truck'

The following example is formatted for the printing of first and second weighing on a weightticket that is inserted twice via a cut-sheet feeder (e.g. LX-300). After the first weighing, the ticket is inserted again for the second weighing and completed. If the first weighing is skipped, because the weight is entered manually or looked up in the first weight memory for known trucks, only the print cycle for the second weighing is carried out.

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1
2
3
4   Date      Time  Consec.-No. V-Reg.-No. ID   First Wgt    Second Wgt   Net Wgt
5   22.03.13  16:30  1234     BM-S 1036    3    15090 kg
6
7   Date      Time  Consec.-No. V-Reg.-No. ID   First Wgt    Second Wgt   Net Wgt
8   22.03.13  17:15  1239     BM-S 1036    3    15090 kg        4020 kg   11070 kg C
9
10  C-Calculated Weight
```

The printout shows the result of a complete cycle with first weighing (line 4, 5) and second weighing (line 7 - 10). Please note that the weight variable for the first weighing is 'Gross'. For the second weighing the stored first weight is called up via the assigned ID and the variable 'Gross1', while the second weight is captured again via the variable 'Gross'. The net weight (variable 'Net') is calculated as difference, and identified as such (e.g. kg C). The text in line 10 serves as explanation. The ID-No. (Ident-No.) points to the record in the data archive.

First weighing:

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
1	1	4	1	No Attribute	Text	Date	–
2	1	4	11	No Attribute	Text	Time	–
3	1	4	17	No Attribute	Text	Cons.-No.	–
4	1	4	29	No Attribute	Text	V-Reg.-No. ID	–
5	1	4	45	No Attribute	Text	First Wgt	–
6	1	4	56	No Attribute	Text	Second Wgt	–
7	1	4	71	No Attribute	Text	Net Wgt	–
8	1	5	1	No Attribute	Fetch	Date	–
9	1	5	11	No Attribute	Fetch	Time	–
10	1	5	19	No Attribute	Fetch	Alibi No.	–
11	1	5	29	No Attribute	Input	V-Reg.-No.	Veh.-No.
12	1	5	39	No Attribute	Fetch	1st WeightID	–
13	1	5	42	No Attribute	Fetch	Gross	–

Second weighing:

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
14	2	7	1	No Attribute	Text	Date	–
15	2	7	11	No Attribute	Text	Time	–
16	2	7	17	No Attribute	Text	Cons.-No.	–
17	2	7	29	No Attribute	Text	V-Reg.-No. ID	–
18	2	7	45	No Attribute	Text	First Wgt	–
19	2	7	56	No Attribute	Text	Second Wgt	–
20	2	7	71	No Attribute	Text	Net Wgt	–
21	2	8	1	No Attribute	Fetch	Date	–
22	2	8	11	No Attribute	Fetch	Time	–
23	2	8	19	No Attribute	Fetch	Alibi No.	–
24	2	8	29	No Attribute	Input	V-Reg.-No.	Veh.-No.
25	2	8	39	No Attribute	Fetch	1st weight ID	–
26	2	8	42	No Attribute	Fetch	1st weight	–
27	2	8	57	No Attribute	Fetch	Gross	–
28	2	8	68	No Attribute	Fetch	Net	–
29	2	10	1	No Attribute	Text	C-Calculated Weight	–

Please note how the weight values are allocated: the gross weight of the first weighing is called up from the first weight memory as 'Gross1' for the second weighing.

The entry of the vehicle registration number can be skipped, e.g. to enter it manually.

Also a weighing cycle carried out with a known tare weight is printed as second weighing (start second weighing, confirm ID-No. = 0 and enter first weight manually).

Printout of second weighing only:

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

 1
 2
 3
 4
 5
 6
 7  Date      Time  Consec.-No. V-Reg.-No. ID   First Wgt    Second Wgt   Net Wgt
 8  22.03.13  19:12  1364     BM-S 1036    0     3020 kg H      15090 kg  12070 kg C
 9
10  C-Calculated Weight
11
12
13
```

The field ID = 0 and the unit sign 'kg H' show that the first weight was manually entered, and not weighed. If the first weight is called up from the reserved memory for known tare weights, the number of this memory location is printed (e.g. ID = 5), but the weight is also marked as entered manually.

Test print:

For the verification of a truck scale an option is helpful for printing weights at various points of the loading curve without the need to use the forms or tickets of the normal weighing cycle. To this effect a simple printout can be configured in block 3. Printing is released with the F5-key from the initial step of the sequence (weight display). For this printout, the output of a formfeed character is disabled.

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
30	3	1	1	No Attribute	Fetch	Date	–
31	3	1	12	No Attribute	Text	Gross	–
32	3	1	20	No Attribute	Fetch	Gross	–

Example for printing (three printouts, one below the other):

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890

1   22.03.13   Gross      10010 kg
2   22.03.13   Gross      20000 kg
3   22.03.13   Gross      29990 kg
```

17.4 Example 'Fill'

```
         1         2         3         4
1234567890123456789012345678901234567890

 FILL Mode
 Ticket-No.      1
 Target       0.200

 Date    01.02.05   No.    1
 Time    14:49
 Gross       0.205kg
 Tare        0.000kg
 Net         0.205kg

 Date    01.02.05   No.    2
 Time    14:49
 Gross       0.205kg
 Tare        0.000kg
 Net         0.205kg

 Total       0.410kg
```

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
1	1	1	2	No Attribute	Text	Fill Mode	–
2	1	2	2	No Attribute	Text	Ticket-No.	–
3	1	2	14	No Attribute	Fetch	Cons.-No.1	–
4	1	3	2	No Attribute	Text	Target	–
5	1	3	11	No Attribute	Fetch	Target	–
6	2	2	2	No Attribute	Text	Date	–
7	2	2	10	No Attribute	Fetch	Date	–
8	2	2	21	No Attribute	Text	No.	–
9	2	2	25	No Attribute	Fetch	Cons.-No.2	–
10	2	3	2	No Attribute	Text	Time	–
11	2	3	10	No Attribute	Fetch	Time	–
12	2	4	2	No Attribute	Text	Gross	–
13	2	4	10	No Attribute	Fetch	Gross	–
14	2	5	2	No Attribute	Text	Tare	–
15	2	5	10	No Attribute	Fetch	Tare	–
16	2	6	2	No Attribute	Text	Net	–
17	2	6	10	No Attribute	Fetch	Net	–
18	3	2	2	No Attribute	Text	Total	–
19	3	2	8	No Attribute	Fetch	Total Net	–
20	3	4	2	No Attribute	Text	(<Space>)	

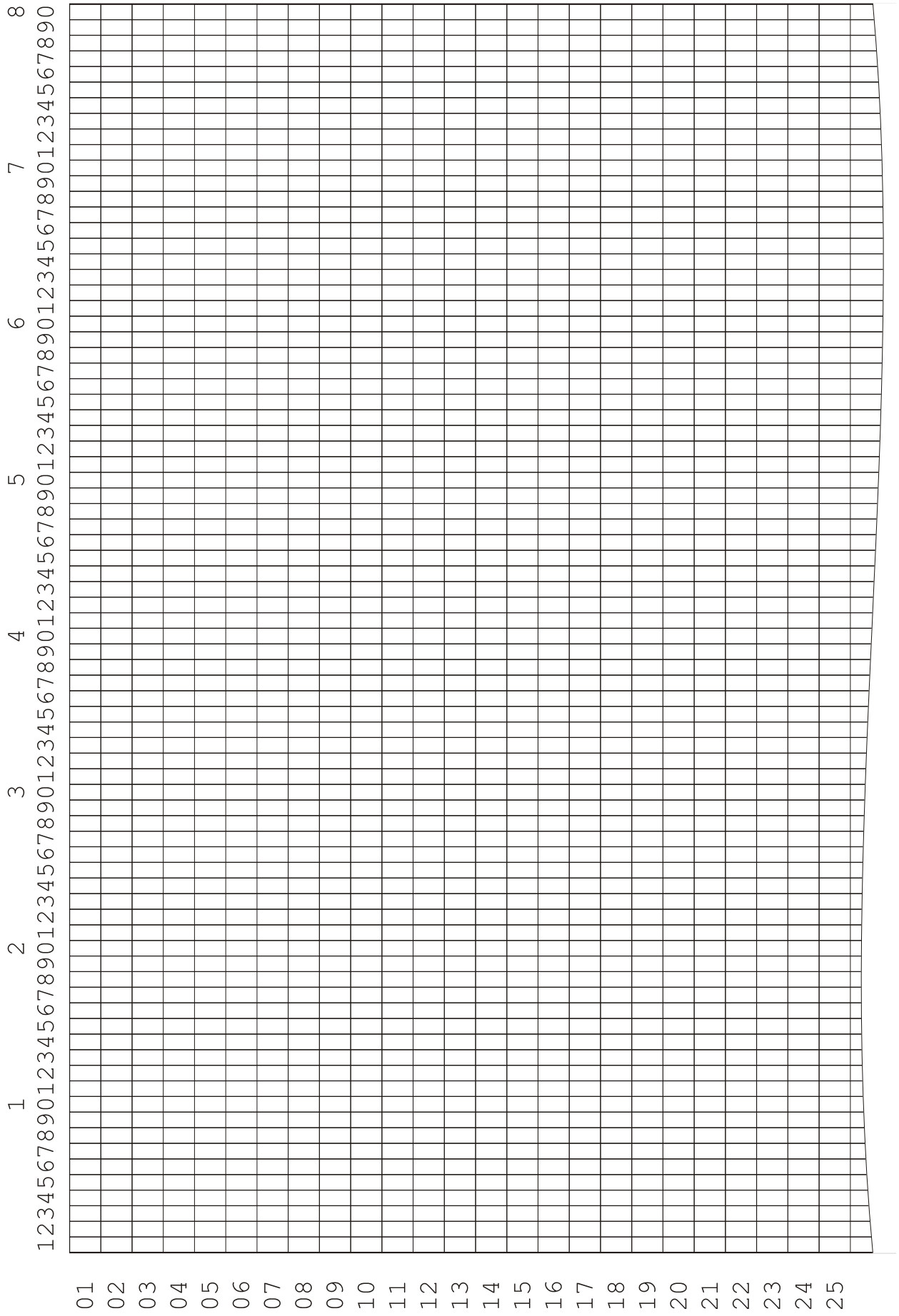
17.5 Field Length Of System Variables

For the configuration of printouts the field length of system variables must be observed to avoid overlapping.

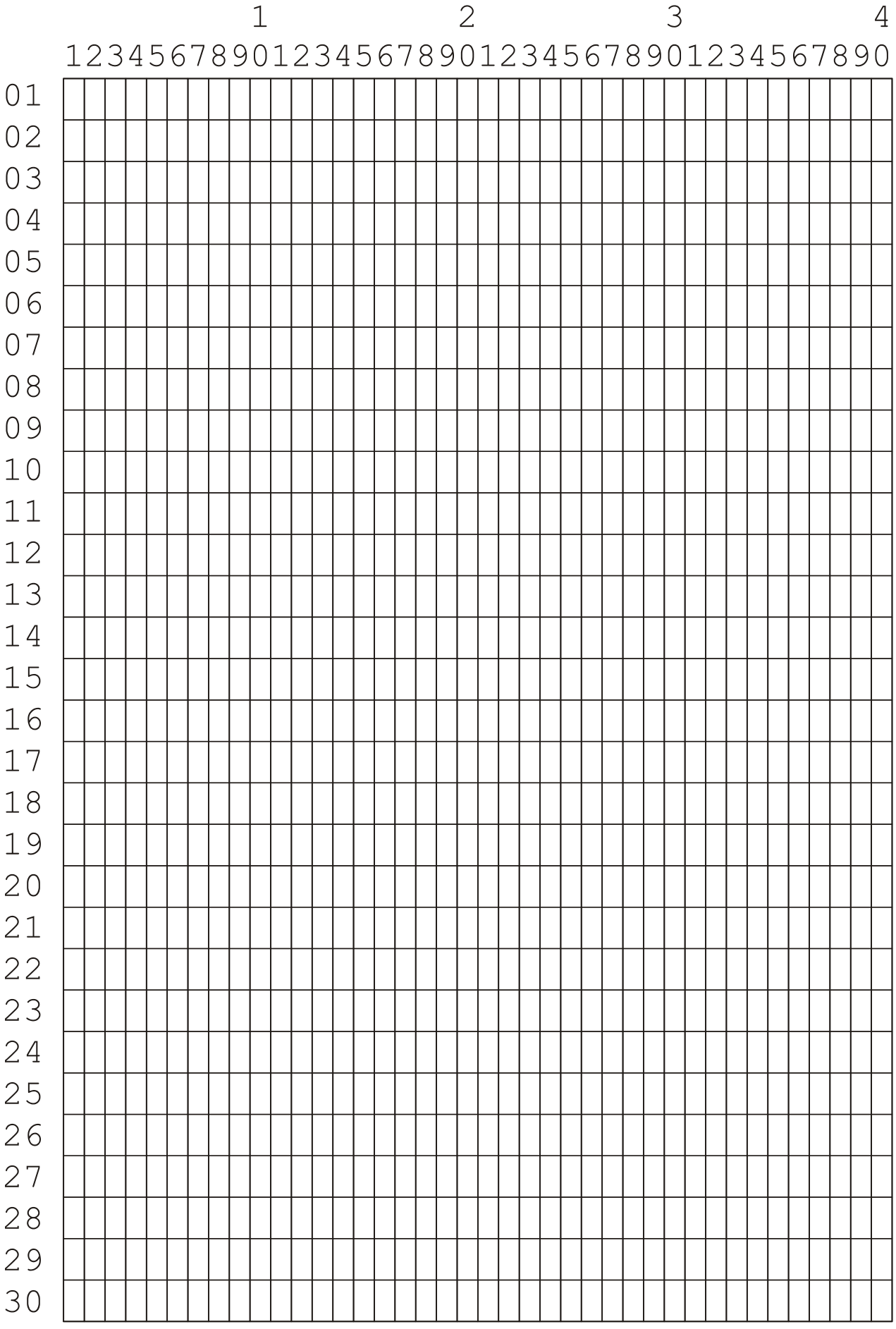
System variable	Field length (characters)	Operating mode
Date	8	all
Time	5	all
Consec. No. 1	5	all
Consec. No. 2	4	all
Gross	13	all
Tare	14	all
Net	13	all
Total gross	12	all
Total tare	12	all
Total net	12	all
Unit	2	all
Avg. piece wgt	10	Count / Basic/Count
Count	10	Count / Basic/Count
Total count	10	Count / Basic/Count
1st weight ID	2 / 5	Truck
Target	8	Fill
Ref. parts	2	Count / Basic/Count
Alibi No.	4	all
Scale No.	1	all
Product	20	Fill 2
1st wgt. date	8	Truck
1st wgt. time	5	Truck
1st alibi No.	4	Truck
1st weight	13	Truck

System variable	Field length (characters)	Operating mode
Date	8	all
Time	5	all
Consec.-No. 1	5	all
Consec.-No. 2	4	all
Average piece weight	10	Count / Basic Count
Piece count	10	Count / Basic Count
Total count	10	Count / Basic Count
Number of reference parts	2	Count / Basic Count
Target	8	Fill
Inbound code of first weighing	2	Truck and Truck/Online
Scale-No.	1	all
Alibi-No.	4	all
Product	18	Fill 2
Date1	8	Truck
Time1	5	Truck
AlibiNo1	4	Truck
Gross1	8	Truck
Gross, tare, net weight	8	all
Unit sign gross	2	all
Unit sign tare	4	all
Unit sign net	3	all
Weight totals	10	all
Unit sign totals	2	all
Unit of calibration	2	all

17.6 Form For Print Layouts (80 Columns)



17.7 Form For Print Layouts (40 Columns)



17.8 Form For Configuration

Field-No.	Block	Line	Column	Attribute	Source	Content	Prompt
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							

18 Data Transmission

Note: Data transmission must be enabled in Supervisor Mode 'Transmission? = Y' and the interface must be correctly configured under 'Application' / 'Host channel: Ethernet or COMx'.

The data transmission combines fields of block 1 and block 2 which have been configured with 'Input' (operator entry), 'Fetch' (access to system variable) or 'Calculate' (arithmetical operation on fields). Fields generated with 'Text' (predefined or entered text string) are ignored.

If data transmission is enabled, a data string is sent to the host system after each completed cycle in block 2, containing all relevant fields of block 1 and 2. This is the case, for instance, after a completed filling cycle (operating mode 'Fill') or after confirming the result of the classification (operating mode 'Check').

The sequence follows the rising order of field-Nos. Additionally, start and end character plus checksum and terminal-No. are transmitted. The individual fields are separated from each other with semicolon. Fields in block 3 are not transmitted. The principal structure of a data string looks as follows:

STX	Start character, is omitted when configured as 00
999	Terminal-No, as specified in the group 'General'
;	Separator
Feld n	Contents of first field in block 1
;	Separator
. . .	Contents of further fields, separated by semicolon
;	Separator
Feld m	Contents of last field in block 1
;	Separator
Feld u	Contents of first field in block 2
;	Separator
. . .	Contents of further fields, separated by semicolon
;	Separator
Feld v	Contents of last field in block 2
;	Separator
ETX	End character, is omitted when configured as 00
Checksum	Checksum, as specified in the configuration

Notes:

- **If a value contains a decimal separator, this is also transmitted. Example: a 6-digit numeric entry with two trailing decimals is internally represented as 9999.99 and transmitted in this format.**
- **Characters not entered or non-significant digits are transmitted as space characters (same as printed).**
- **For the transmission the ACK/NAK protocol is used (see description further down below).**
- **In the operating mode 'Truck' only fields in block 2 (after a completed second weighing) are transmitted. There is no separate transmission for first weighings in block 1.**
- **If a data transmission cannot be carried out correctly, the message '`Error Data Transm.`' is displayed. The operator can then press the ↵–key to repeat the transmission or press the F8-key to abort the transmission (for this cycle). If it is not possible to rectify the cause of the problem, data transmission can be disabled permanently in Supervisor Mode.**

18.1 Data Transmission Example 1

For the factory-set default printing (Simple Weighing) a data string is sent after each printout as follows:

Content	Print Field	
STX		Start character, is omitted when entered as 00
999		Terminal-ID, as specified in group 'General' of Service Mode
;		Separator
Date	2	8 characters (99.99.99)
;		Separator
Time	4	5 characters (99:99)
;		Separator
Gross	6	8 characters (99999999), format as per calibration, plus space, plus unit sign, 2 characters
;		Separator
Tare	8	8 characters (99999999), format as per calibration, plus space, plus unit sign, 5 characters
;		Separator
Net	10	8 characters (99999999), format as per calibration, plus space, plus unit sign, 4 characters
;		Separator
ETX		End character, is omitted when configured as 00
Checksum		Checksum, as specified in the configuration

18.2 Data Transmission Example 2

For the configuration example with header, capturing of weight and price calculation, the data string looks as follows:

Content	Print Field	
STX		Start character, is omitted when entered as 00
999		Terminal-ID, as specified in group 'General' of Service Mode
;		Separator
Customer	2	4 digits (9999)
;		Separator
Article	4	4 characters (XXXX)
;		Separator
Ticket	6	Consecutive-No. 1; 5 digits (99999)
;		Separator
Price/kg	8	5 digits (99.99)
;		Separator
Date	11	8 characters (99.99.99)
;		Separator
Time	13	5 characters (99:99)
;		Separator
Gross	15	8 characters (99999999), format as per calibration, plus space, plus unit sign, 2 characters
;		Separator
Tare	17	8 characters (99999999), format as per calibration, plus space, plus unit sign, 5 characters
;		Separator
Net	19	8 characters (99999999), format as per calibration, plus space, plus unit sign, 4 characters
;		Separator
Item Counter	21	Consecutive-No. 2; 4 digits (9999)
;		Separator
ETX		End character, is omitted when configured as 00
Checksum		Checksum, as specified in the configuration

Fields in the totals section (block 3) are not transmitted.

18.3 Data Transmission Example 3

For the truck scale configuration described in the previous chapter, a data string is transmitted after each completed second weighing:

Content	Print Field	
STX		Start character, is omitted when entered as 00
999		Terminal-ID, as specified in group 'General' of Service Mode
;		Separator
Date	21	8 characters (99.99.99)
;		Separator
Time	22	5 characters (99:99)
;		Separator
Consec.-No.	23	Consecutive-No. 2, 4 digits (9999)
;		Separator
Veh-Reg.-No.	24	10 characters (XXXXXXXXXX)
;		Separator
First W. ID	25	ID of first weight, 2 digits (99), 00 for manual entry of first weight
;		Separator
First Weight	26	8 characters (99999999), format as per calibration, plus space, plus unit sign, 2 characters
;		Separator
Second Weight	27	8 characters (99999999), format as per calibration, plus space, plus unit sign, 5 characters
;		Separator
Calculated Weight	28	8 characters (99999999), format as per calibration, plus space, plus unit sign, 4 characters
;		Separator
ETX		End character, is omitted when configured as 00
Checksum		Checksum, as specified in the configuration

No data string is transmitted for the first weighing and data capturing in block 3 (test print).

18.4 Protocol For Data Transmission

For the data transmission the ACK/NAK protocol is used (except for operating modes Online and Truck/Online which use the Online protocol described in the respective chapter). The ACK/NAK protocol is carried out as described below:

IT3000M → PC

Control Character / Data	Comment
Start character	Can be selected or deselected in Service Mode
Data fields in ASCII-format	Data fields and their length, sequence and decimal point location depend on the configuration. The individual fields are separated from each other with a semicolon.
End character	Can be selected or deselected in Service Mode
Checksum	Can be selected or deselected in Service Mode, options: XOR, compliment of twos, no checksum

PC → IT3000M

Control Character / Data	Comment
ACK	Positive confirmation for correctly received data string

or

PC → IT3000M

Control Character / Data	Comment
NAK	Negative confirmation for not correctly received data string

The IT3000M timeout delay for the reception of ACK or NAK is 6 sec. If a response cannot be received within 6 sec or if a negative response is received (NAK), the transmission of the data string is repeated up to 4 times. If after a total of 5 transmission attempts a response cannot be received or if only negative responses are received, an error message is indicated on the display of the IT3000M terminal which must be acknowledged by the operator. The operator has the choice either to start the transmission anew by pressing the ↵-key (e.g. after rectifying the problem) or switch off the data transmission by pressing the F8-key.

19 Continuous Output

The interfaces COM1 – COMx can be configured as continuous output, one of several protocols can be chosen in group 'General' of the Service Mode.

Setting of interface parameters is made in group 'Interface' of the Service Mode.

19.1 SysTec Protocol

The data string consists of 15 ASCII characters plus CR and LF. It includes a status for motion / no motion, the net weight and the unit sign. Digits not used are filled with space characters. Examples:

Digit: '123456789012345'

'S 10.98 t ' **S = Scale settled (no motion),**

'SD 10980 kg' **SD = Scale in motion (not settled),**

13th character always space.

19.2 Flintec Protocol

The data string to connect a Flintec remote display consists of 1 start character (@), 7 ASCII characters for the net weight plus CR. Example:

Char.: '123456789'

'@ 10.95$^{C}_{R}$' **1. character always @ (Hex 40)**

9. character always CR (Hex D)

non-significant digits of the weight value are transmitted as space characters (Hex 20).

19.3 SysTec Remote Protocol

This data string is used to connect an IT1000 remote display with extended functions.

The operating mode 'Remote Display' must be chosen in the configuration of the IT1000 remote display. Actuating the tare and zero key at the remote display is transmitted back to the weighing terminal and has the same effect as pressing the corresponding key here.

The data string is identical to the 'SysTec Standard Protocol'.

19.4 Schauf Protocol

The data string to control a Schauf remote display consists of [ESC], [33], [32], 1 space character, 5 ASCII characters for the net weight plus [CR].

19.5 Customized Protocol

The data string can be freely defined. In the table below x and y are wild cards. If you want -for instance- to send the character ~ when the scale is in motion, the corresponding string is M~:R (condition = true).

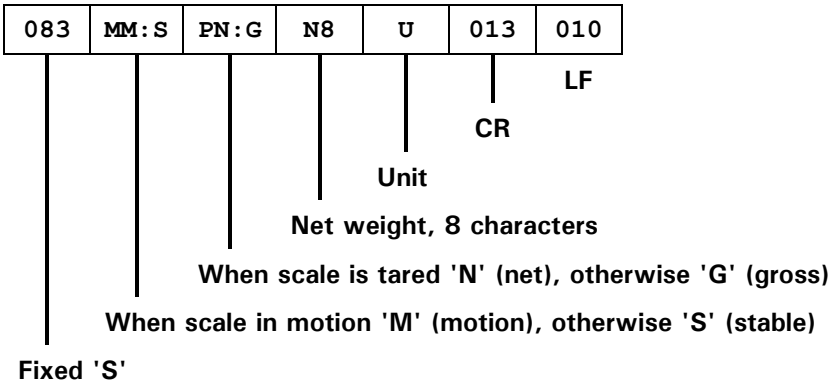
If the condition is false, character R is sent instead.

Weights are transmitted as shown on the display including decimal separator.

Non-significant (leading) weight digits are transmitted as space.

String	Transmission	Example
Mx:y	Transmits the character specified under x, when the scale is in motion, e.g.: ~, otherwise transmits the character specified under y	M~:R
mx:y	Transmits the character specified under x, when the scale is settled, e.g.: R, otherwise transmits the character specified under y	mR:~
Ox:y	Transmits the character specified under x, when the scale is in overload, e.g.: U, otherwise transmits the character specified under y	OU:N
ox:y	Transmits the character specified under x, when the scale is not in overload, e.g.: U, otherwise transmits the character specified under y	oN:U
Zx:y	Transmits the character specified under x, when the scale is in zero range, e.g.: N, otherwise transmits the character specified under y	ZN:A
zx:y	Transmits the character specified under x, when the scale is not in zero range, e.g.: N, otherwise transmits the character specified under y	zA:N
Px:y	Transmits the character specified under x, when the scale is tared, e.g.: T, otherwise transmits the character specified under y	PT:N
px:y	Transmits the character specified under x, when the scale is not tared, e.g.: T	pN:T
[space]	Transmits a space character	[space]
Gx	Transmits the gross weight with x digits, e.g.: 8	G8
Nx	Transmits the net weight with x digits, e.g.: 8	N8
Tx	Transmits the tare weight with x digits, e.g.: 6	T6
U	Transmits the unit of calibration, e.g: 'kg', 't ', 'g ', 'lb'	U
R	Transmits the weighing range, space for single range scales	R1
123	Transmits a specified character (3-digit decimal code)	002 = STX
S	Special character from application, for example traffic light control.	S

Example for a data string to control a remote display with motion / no-motion and gross / net indication.



20 Transport, Maintenance And Cleaning

20.1 Transport

Notes:

- **Transport and storage of electronic components such as boards, EPROMS, etc. must only be made in suitable anti-static ESD bags or cases.**
- **Storage temperature –25 to +70°C at 95% max. relative humidity without condensation.**

20.2 Maintenance

CAUTION

- **This unit and its associated equipment must be maintained by qualified personnel only, who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. Failure to observe these precautions could result in bodily injury!**

  Disconnect all power to this unit before servicing!

The weighing terminal is designed to require a minimum of maintenance and service, however, depending on the environmental conditions a visual inspection at regular intervals is recommended. The frequency at which normal maintenance (cleaning and inspection) should be performed, when installed in a clean office environment, should be twice a year. However, if the unit is subject to a dusty or dirty environment the frequency should be increased as required. At these inspections it should be made sure that all connected cables are undamaged and that all connectors are tightly fastened.

Maintenance of scale platforms is required at regular intervals depending on use and environment. The accuracy of scales can be affected by dirt, foreign objects, etc. and appropriate maintenance is strongly recommended. Also recommended is the calibration with certified test weights at regular intervals.

20.3 Cleaning

CAUTION

- **Disconnect all power to this unit before servicing!**

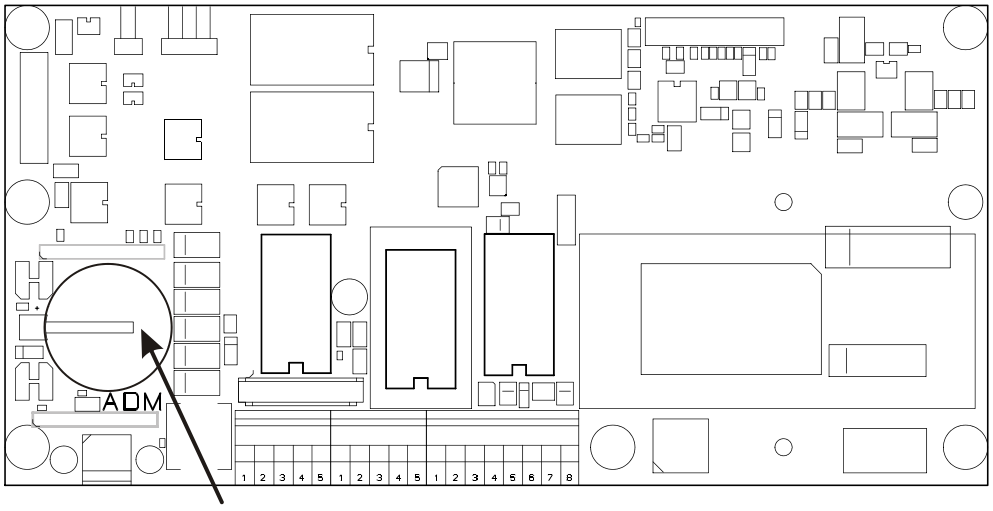
Clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner. Do NOT use any type of industrial solvent or the finish of the unit may be damaged. Do not spray cleaner directly on the unit.

20.4 Replacing The Battery

CAUTION
For the storage of data the weighing terminal contains a lithium battery. Risk of explosion if battery is replaced improperly! Replace only with battery of the same type or with compatible type recommended by manufacturer. Disposal of used batteries only as indicated by manufacturer.

The life time of the lithium battery that backs up RAM and real-time clock is at least three years in normal operation. Thus, the battery needs to be replaced at 3-year intervals by a trained service technician.

W A R N I N G
Disconnect all power to the instrument and/or unplug line cord prior to opening the housing! Failure to observe this precaution could result in bodily injury!



Batterie

To replace the battery proceed as follows:

- **Disconnect all power to the instrument, unplug line cord.**
- **Open the housing and refer to picture above to locate the mainboard.**
- **Carefully remove old battery from holder and insert new one within 30 sec. Note: Observe correct polarity as shown on the picture, otherwise the entered data will not be stored!**
- **Close housing and power the instrument up. Display of weighing terminal shows power up message. The unit is operational again.**

Please note: Observe all applicable regulations for the disposal of used batteries!

21 Trouble Shooting

CAUTION

- **This unit does not contain any customer serviceable parts!**

  Only permit qualified personnel to service this equipment. Exercise care when making checks, tests, and adjustments!

If any problem arises that has not been explained above, please follow this check list:

- **Power supply on and line cord undamaged (visual inspection)?**
- **All cables connecting to scales and peripheral devices undamaged (visual inspection)?**
- **Connectors fitted correctly and tightly secured at peripheral devices (visual inspection)?**

If operational difficulties are encountered that cannot be rectified by means of this manual, obtain as much information as possible regarding the particular trouble, as this may eliminate a lengthy, detailed checkout procedure.

If possible, try first to determine the conditions under which the problem occurs. Try to find out whether the appearance of the difficulties can be reproduced under the same conditions.

For the systematic analysis of an unknown problem the information as listed below is required:

- **Serial-No. of the unit and its peripheral components**
- **Program version as displayed on power up**
- **Exact wording of any error message displayed**
- **Type and model of peripheral devices related to the problem (e.g. scale, printer, etc.)**

To obtain professional assistance contact your service station stating the information listed above.

CAUTION

- **It is suggested that assistance from trained service personnel be requested in the event a problem should arise that is beyond the scope of this instruction manual.**

21.1 Error Log Of Scale

```
Calibrate Scale 1
```

F1 **View error log of scale**

```
06.06.12 08:52    Ok
```

Date, time and error code of event are shown.

Code	Event
Ok	Ok
Over	Overload
Under	Underload
Range	Out of range
Miss.	Not installed
Incl.	Incline sensor
PUOvr	Powerup out of range
PUUdr	Powerup motion
Invalid	Not calibrated
IOErr	I/O error
Not I	Not installed
NotOk	Not ok
E32	Other error message 32

21.2 Error Messages

If an error occurs during calibration or normal operation, error messages are displayed as follows:

Error Message	Possible Cause	Corrective Measure
Calibration Locked	• Jumper for protection of calibration parameters in position 'protected'	• Set calibration jumper to calibration position
Error Calibr. Jumper	• Parameters cannot be saved, jumper in wrong position	• Set jumper to correct position, repeat calibration
ADM not installed	• No A/D converter installed	• Check A/D converter
Not Available	• No scale selected	• Check parameters in Service Mode
ADM Defect **ADM Error**	• No data received from A/D converter	• Replace A/D converter
	• Short circuit in L/C cable	• Check cabling
Resolution Error	• Internal resolution too small, must be at least tenfold the displayed resolution	• Select bigger increment size • Use L/C with lower capacity
ADM Over **Out Of Range**	AA/D converter overrange:	
	• Wiring error loadcell	• Check wiring
	• Loadcell defective	• Check loadcell
	• Scale heavily overloaded	• Unload scale

Error Message	Possible Cause	Corrective Measure
`--------` `Overload`	• Scale in overload • CPU does not receive data from weighing interface	• Unload scale • Check internal and external wiring and cabling
`U n d e r l o a d`	• Gross weight smaller than −20d (below zero)	• Load scale • Set parameter 'Underload 20d' to N= disabled
`Powerup Out of Range` `Not In Zerorange`	• Error power up zero. This message appears on power up if the weight on the scale exceeds the power up zero range (+2%,+10%) or is below the power up zero range as set in the calibration (−2%, −10%) as set in the calibration.	• Unload scale or apply dead load
`Powerup Motion`	• This message appears on power up if the terminal cannot detect a settled weight within the specified power up zero range (±2%, ±10%).	• Settle scale
`Error Transmission`	• Host switched off or off-line, data cable not connected or damaged	• Switch on host and start communication program • Check cable and connectors • If problem cannot be rectified, disable data transmission in Supervisor Mode

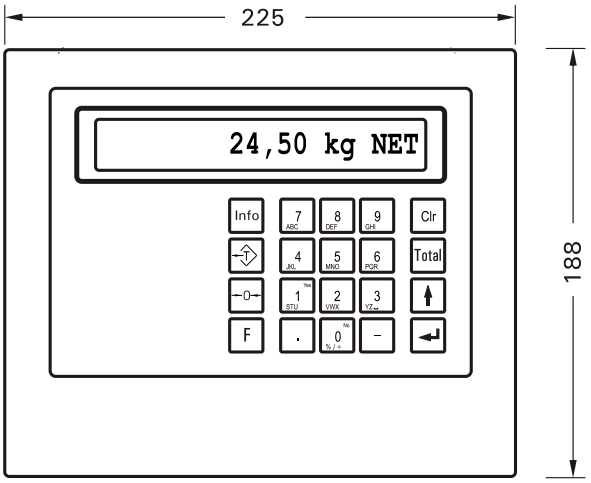
22 Technical Data

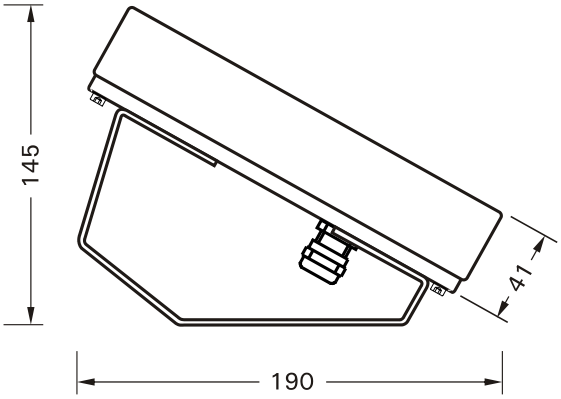
Housing	**Stainless steel wall/desk housing, protected to IP69K, weight approx. 1,5kg**
	Panel-mount stainless steel housing, fascia plate protected to IP65, weight approx. 1.5kg
Temperature range	**Storage: –25°C to +70°C at 95% relative humidity max. without condensation** **Operation: –10°C to +40°C at 95% relative humidity max. without condensation**
Power supply AC version:	**Supply voltage: 110V(–15%) –240V(+10%)** **Rated frequency: 50 – 60 Hz** **Rated current: 200mA**
Power supply DC version:	**Supply voltage: 12 – 30 VDC (–15% to +10%)** **Rated current: 700 – 200mA**
Power supply BATT version:	**Supply voltage: 12 – 30 VDC (–15% to +10%)** **Rated current: 700 – 200mA**
Electrical safety	**Separation between primary and secondary circuits SELV, in accordance with EN 60950, over-voltage category II**
Display	**Back-lit LCD display, 20 characters, height 14mm, 5x7 dot matrix**
Keyboard	**Membrane keyboard with tactile feedback, 20 keys incl. numeric keypad, scale keys and function keys, entry of alpha characters via multiple key assignment**
Processor	**32-bit ARM processor, 266MHz** **Linux operating system**
Scale interface module	**1xADM or 1xDUAL-ADM to connect analog loadcells in 4- or 6-wire mode;** **W&M approved resolution of 6000 divisions, 50 – 400 updates / second** **Overall impedance of connected loadcells: 43 – 4500 Ω or:** **1xDWB to connect digital loadcells with RS485 interface** **1xIDN to connect Mettler-Toledo digital force transducers with IDNet interface**
Battery	**Battery CR2032** **2 MByte data memory with battery backup;** **battery backup for data, parameters and files (min. 3 years in normal operation, approx. 1 year when permanently switched off), optional data backup on PC.**

Options:

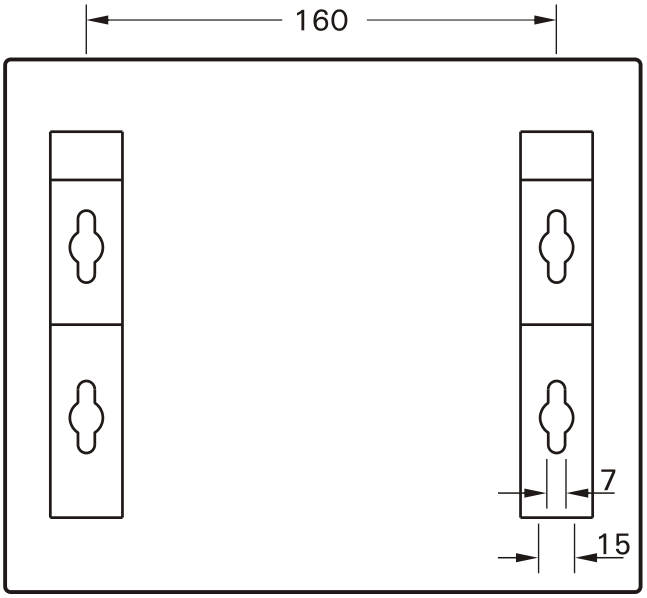
Serial interface modules 2xSIM	**SIM-RS232, SIM-RS485-4-wire, SIM-RS485-OPTO,** **SIM-20mA (only passive / passive), baud rate 300 – 19200 baud**
Digital I/O modules 1xPIM	**2 optoisolated digital inputs (12 - 24VDC / 7 mA)** **2 optoisolated digital outputs (12 - 24VDC / 100mA)**
Analog output module 1xDAU	**1 analog output related to gross or net weight,** **0 - 20 mA, 4 - 20 mA, 0 - 10 V, 2 - 10 V selectable**

23 Dimensions

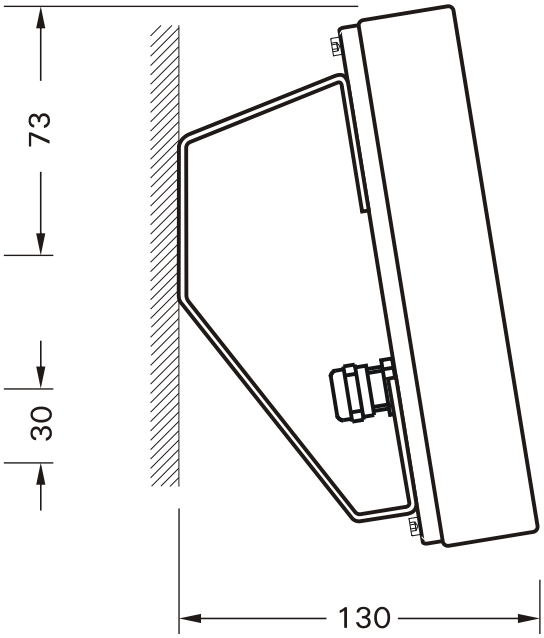




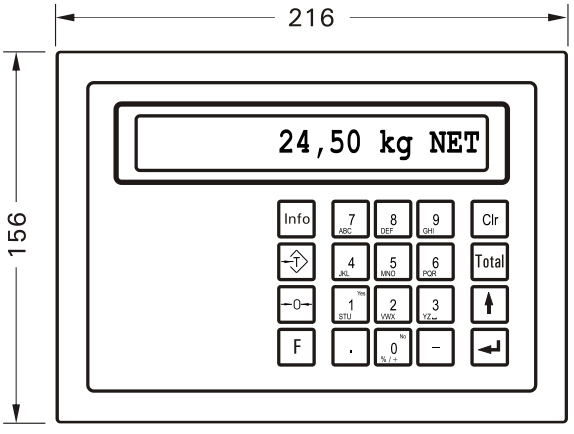
Fixing holes

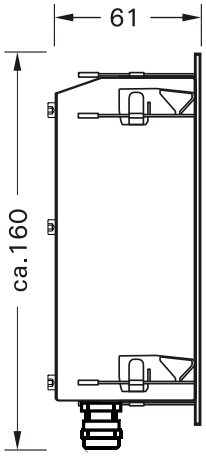


Wall-mount installation

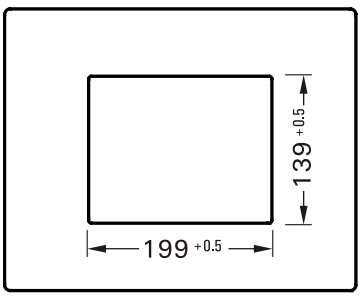


Panel-mount installation





Cutout in panel



24 Service Password

The service password is required to access the Service Mode.

The password is: 2234

If you want to prevent unauthorized access to the Service Mode, remove this page from the manual and keep it in a safe place.

If access to the Supervisor Mode of the application program is protected by a *User Password*, also entry of the *Service Password* is accepted. This might be helpful in cases when the User Password is not available any more.