LAHTI PRECISION
Experience that weighs

INSTALLATION MANUAL

WA-800 Product Family

DE020095 V1.9

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The Manual

This manual describes the WA-800 Series weighing indicator, WA-801, WA-802, WA-802r, WA-804, WA-805, WA-806, WA-807 and WA-810.

It explains:

- Installation
- The connections wiring
- Connections
- The accessories
- Stamping plates.

You can find additional information (such as other details on the fieldbus couplings) in the following manual for the WA-800 Product Family system.

- User's Guide WA-801/802 Weight Indicator
- User's Guide WA-805 Filling Scale Controller
- User's Guide WA-806 Discharge Scale Controller
- User's Guide WA-807 Catch Weighing Controller
- User's Guide WA-810 Totalizing Belt Scale Indicator

- Operating Manual WA-801/802 Weight Indicator
- Operating Manual WA-805 Filling Scale Controller
- Operating Manual WA-806 Discharge Scale Controller
- Operating Manual WA-807 Catch Weighing Controller
- Operating Manual WA-810 Totalizing Belt Scale Indicator

- Communication Manual WA-800 Product Family
- Communication Manual WA-810 Totalizing Belt Scale Indicator

1. SAFETY NOTES

Using for the Intended Purpose

The measuring system with its connected mechanical components is only intended for weighing and control applications.

Sources of danger

The measuring system does not generate any hazards during the weighing process if the system is properly installed and put into service.

Using the measuring system might be dangerous if the system takes on control functions or when the material weighed is transported.

Potential sources of danger would then be add-on equipment that the material weighed is transported in or metered through. In such cases, the measuring system may cause residual hazards if untrained staff uses or operates it incorrectly.

This measuring system may be a component of a more complex system. The system operator bears the full responsibility for operating safety.

Identification of residual hazards

This symbol indicates hazards that could cause personal injury or even death in extreme cases.

This symbol indicates hazards that could cause property damage to the measuring system or other system components.

Personnel

Only trained technical staff may prepare, install, start up, operate, service or maintain the measuring system.

Everyone doing work on the measuring system should read the safety instructions and be aware of and follow the parts of the service manual applicable to them.

The operator should use the service manual to instruct the operating personnel to comply with all regulations and instructions.

Changing parameters

Parameters dictate how the measuring system functions. Only persons familiar with the system's function should change the parameters. Incorrect parameter settings may be dangerous to persons or cause property damage with control systems connected to the system. They may also greatly disturb the process.

Password

Parameters are protected by password from being changed without authorization. The measuring system operator should use the password in a responsible fashion.

Acknowledging fault indications

Fault indications may only be acknowledged after the cause of the fault has been rectified.

Before acknowledging a fault, please ensure that connected peripheral units are functioning properly. Especially connected control systems should be in a defined and safe state.

Service and maintenance

Please read all of the warning signs on the scale.

Switch off power supply of the measuring system before working on the mechanical equipment or peripheral units (particularly control systems). Take appropriate action to ensure that the measuring system cannot be inadvertently restarted.

Before performing work on the electrical equipment, disconnect the power supply.

Moisture and humidity

All parts of the scale (particularly the electrical components) have to be protected from moisture and humidity when the casing is open (for instance, during service and maintenance work). Otherwise, please observe the protection class of the casings.

Design modifications

If you make design modifications on the measuring system or add components that manufacture does not supply, Manufacture shall not accept any liability or warranty. This especially applies to modifications that may have an impact on operational safety.

Replacing parts

Only use original spare parts if parts have to be replaced during repairs. If other spare parts are used, the warranty shall be rendered invalid.

2. HOUSING DIMENSIONS

The WA-801, WA-802, WA-804, WA-805, WA-806, WA-807, WA-810 stainless steel protection class IP65 casing is designed for table installation. It can also be mounted on the wall after rotating the lid (downward cable outlet).

New casing was introduced in the end of year 2010. New casing is shown in picture 1. Old casing is shown pirtures 2 and 3.

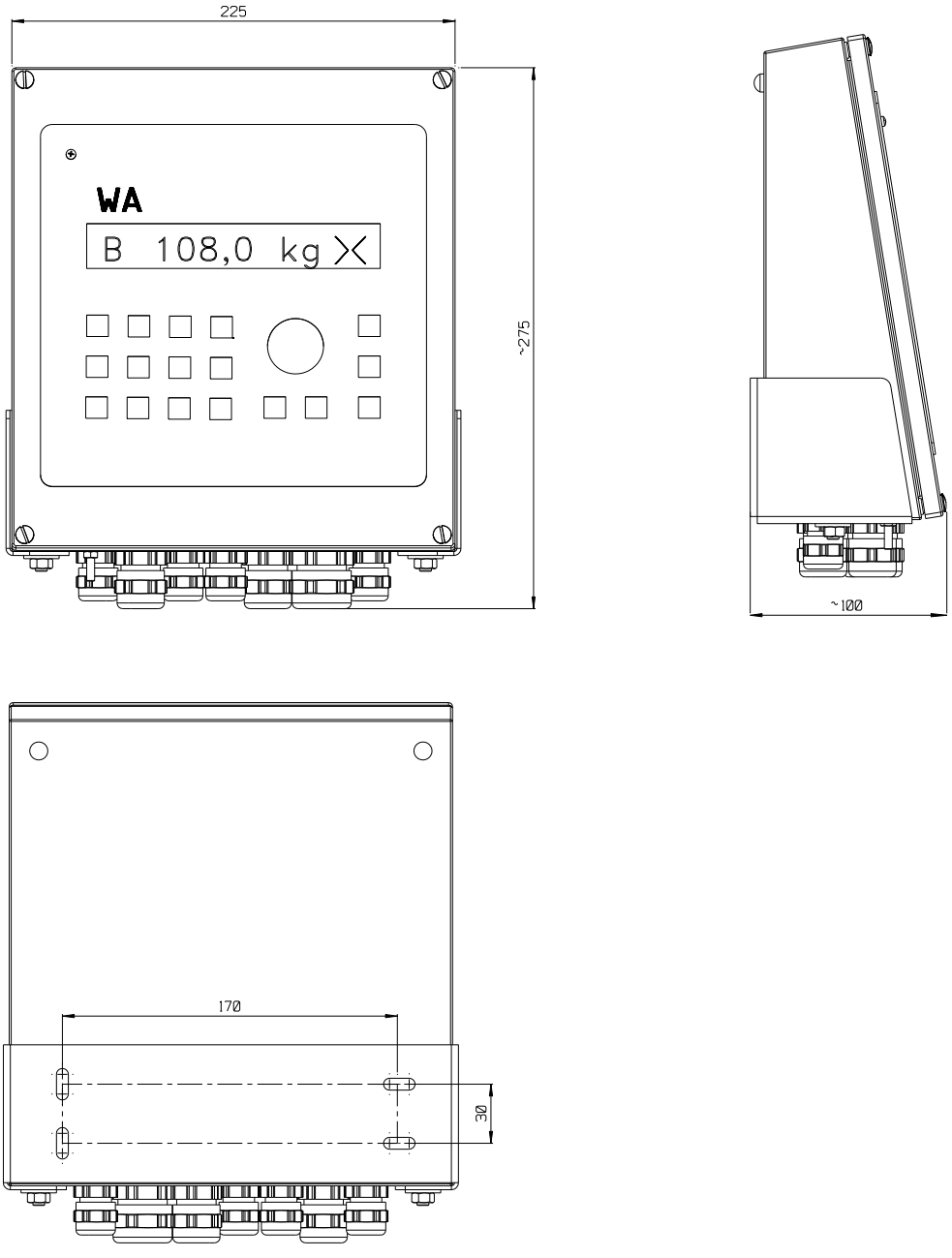


Fig. 1. Dimensions and drilling pattern of new casing.

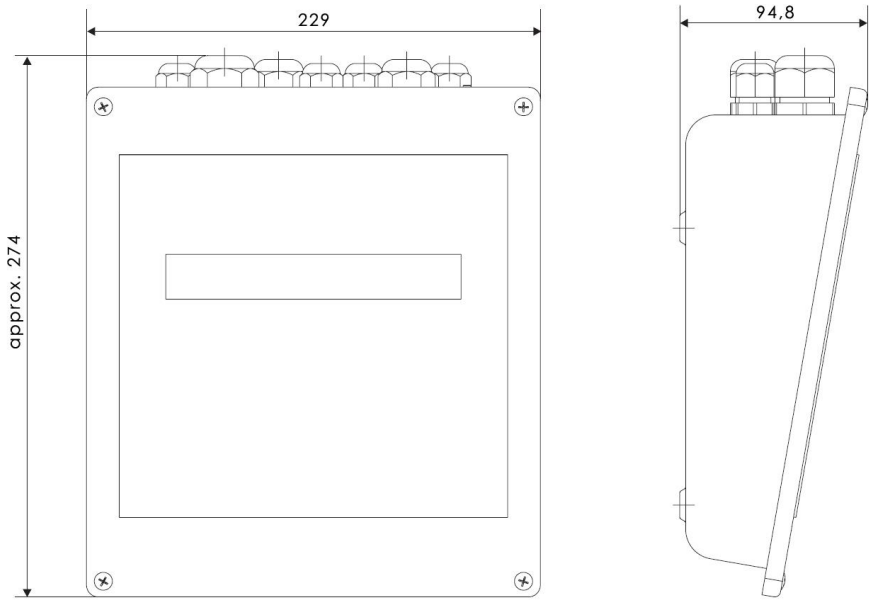


Fig. 2. Dimensions of old casing.

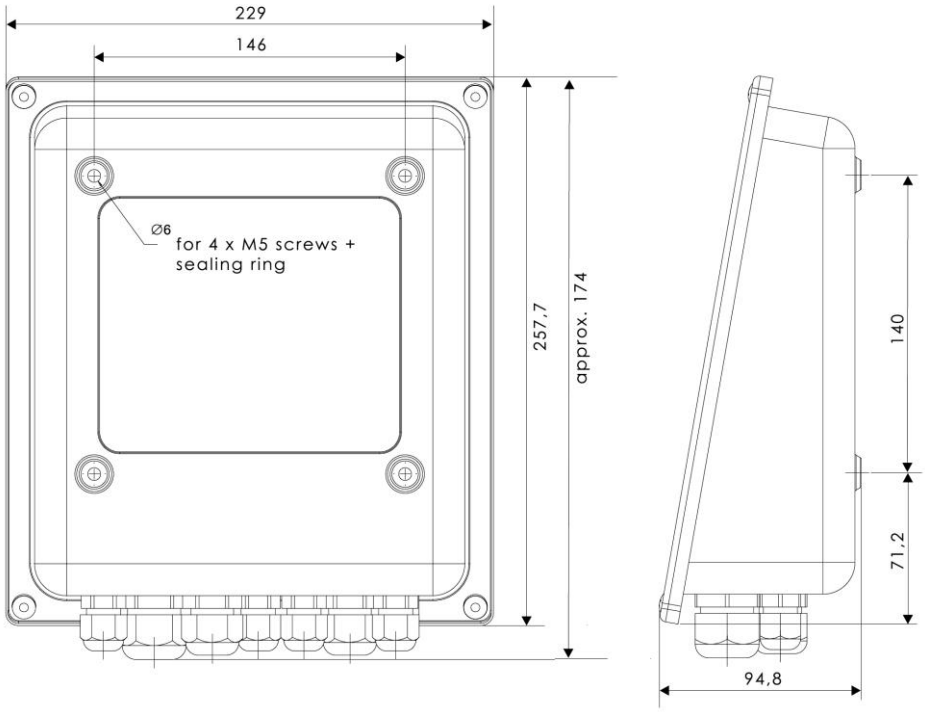


Fig. 3. Drilling pattern for wall mounting of old casing.

The required mounting hardware is included in the system

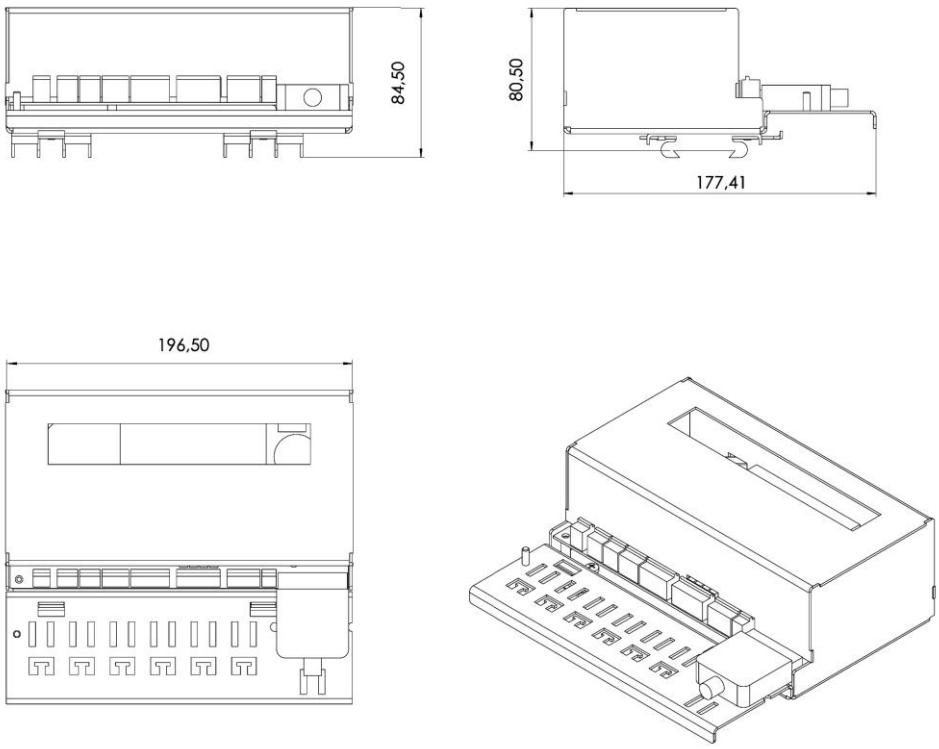


Fig. 4. The dimensions of the WA-802r top-hat rail mounting dimensions.

3. LEDS ON THE SYSTEM

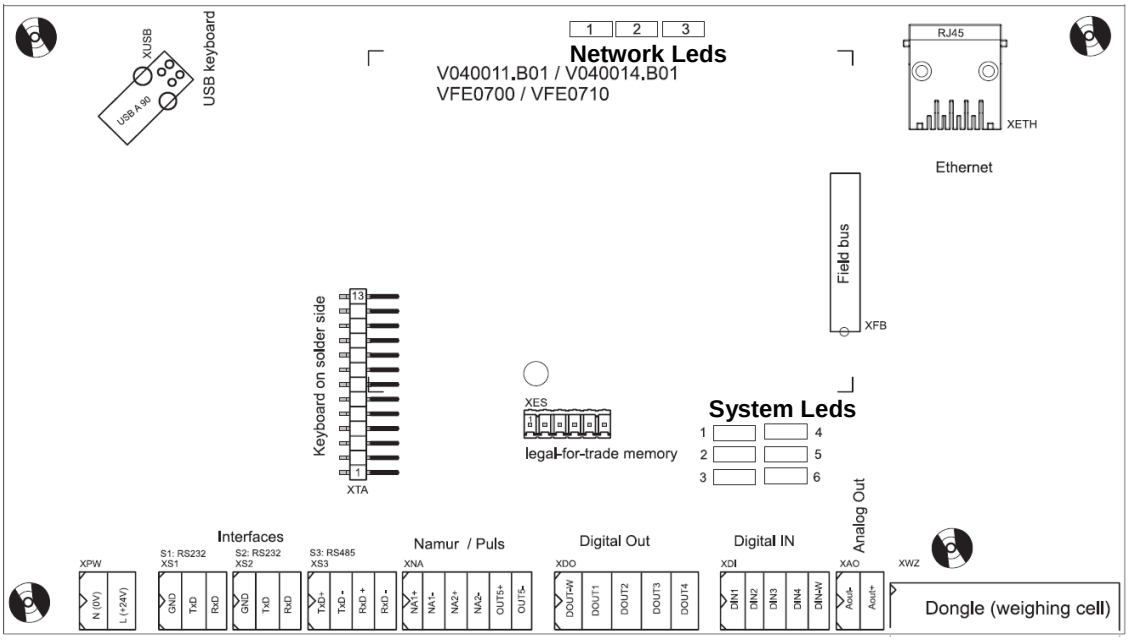


Fig. 5. Mainboard.

Table 1: System leds

Led	*Name / color*	*Note*
1	PWRST (green)	The supply voltage is applied
2	Idle: (yellow)	Display of system load. Longer ON period = less load
3	Fault (red)	Error message
5	Sys-CL (yellow)	System clock, flashes in normal operation
4, 6	Diag (green / red)	No function

Table 2: Network leds

Led	*Name / color*	*Note*
1	Link (green)	Ethernet connected
2	DX (yellow)	Full duplex
3	100 (red)	100 M baud (otherwise 10 M baud)

4. CABLES

4.1. Cable glands

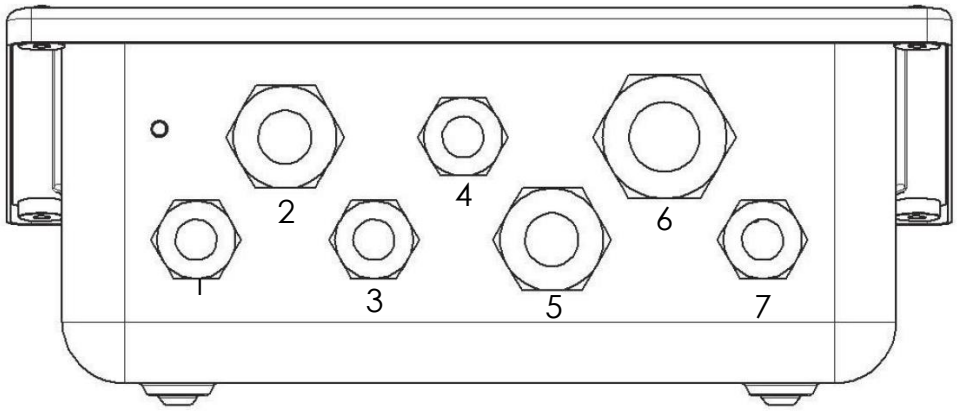


Fig. 6. Cable glands

Table 3: Cable glands

Gland	Size
1	M16 x 1.5
2	M20 x 1.5
3	M16 x 1.5
4	M16 x 1.5
5	M20 x 1.5
6	M25 x 1.5
7	M16 x 1.5

4.2. Cables

Stainless steel housing has power supply connection cable with main plug. If cable has to change the EMI filter have to fix to new cable.

Top-hat rail mounting WA-802r version (figure 3.) don't have power supply connection cable. Cable wire diameter is selected by the cable length. If installations have more than one WA-802r unit, must the power supply connection cables connect to star point at the power supply.

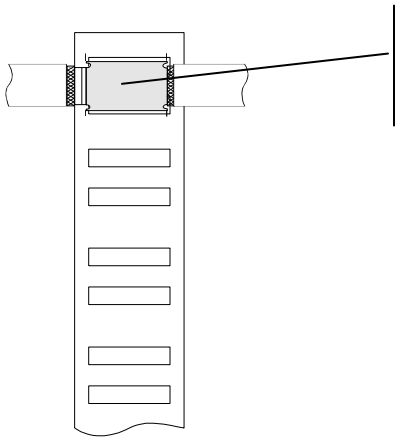
Note: WA-801/WA-802/WA-804/WA-805/WA-806/WA-807/WA-810 Terminal XPW Power supply voltage is 85-250VAC.

WA-802r Terminal XPW Power supply voltage is 18-36VDC.

Shielded cables: Cables, which have to be shielded.

- Load cell interface cable
- Analog output
- Serial interface cables
- Ethernet cable at the fixed installation and at the industrial environment (at least CAT5E).

Note: It is not desirable use wire ferrules for connecting cable to the connectors 1-8, Figure 7 and 8.



Screened cables, load cell connection, the serial-interfaces, are fixed to the rail (earthed) with the attached clamps.

4.3. Warning about electrical welding

All electrical welding jobs in close to weighing instrument should be made before installation of load cells. If welding is necessary after the load cells are installed and connected to the weight indicator the following measures must be carried out:

1. Disconnect each individual load cell cable from the junction box or weight indicator.

2. Remove the load cells from welding area if it is possible.

If the load cells cannot be removed, place the earthing electrode of the welding apparatus so close to the weld as possible and <u>unconditionally so that welding current does not run through the load cells.</u>

4.4. Connecting load cells

Load cell connection to the WA-800 is parallel connection, figure 6. Corner adjustment is done with resistors in the connection box. Take care when more load cells are connected to one channel, load impedance may not be less than 43Ω.

Load cell extension cable is connected in load cell connection box, table 5 and parallel connection, table 6. Load cell extension cable must be done with twisted-pair screened (shield) cable or compatible, table 7.

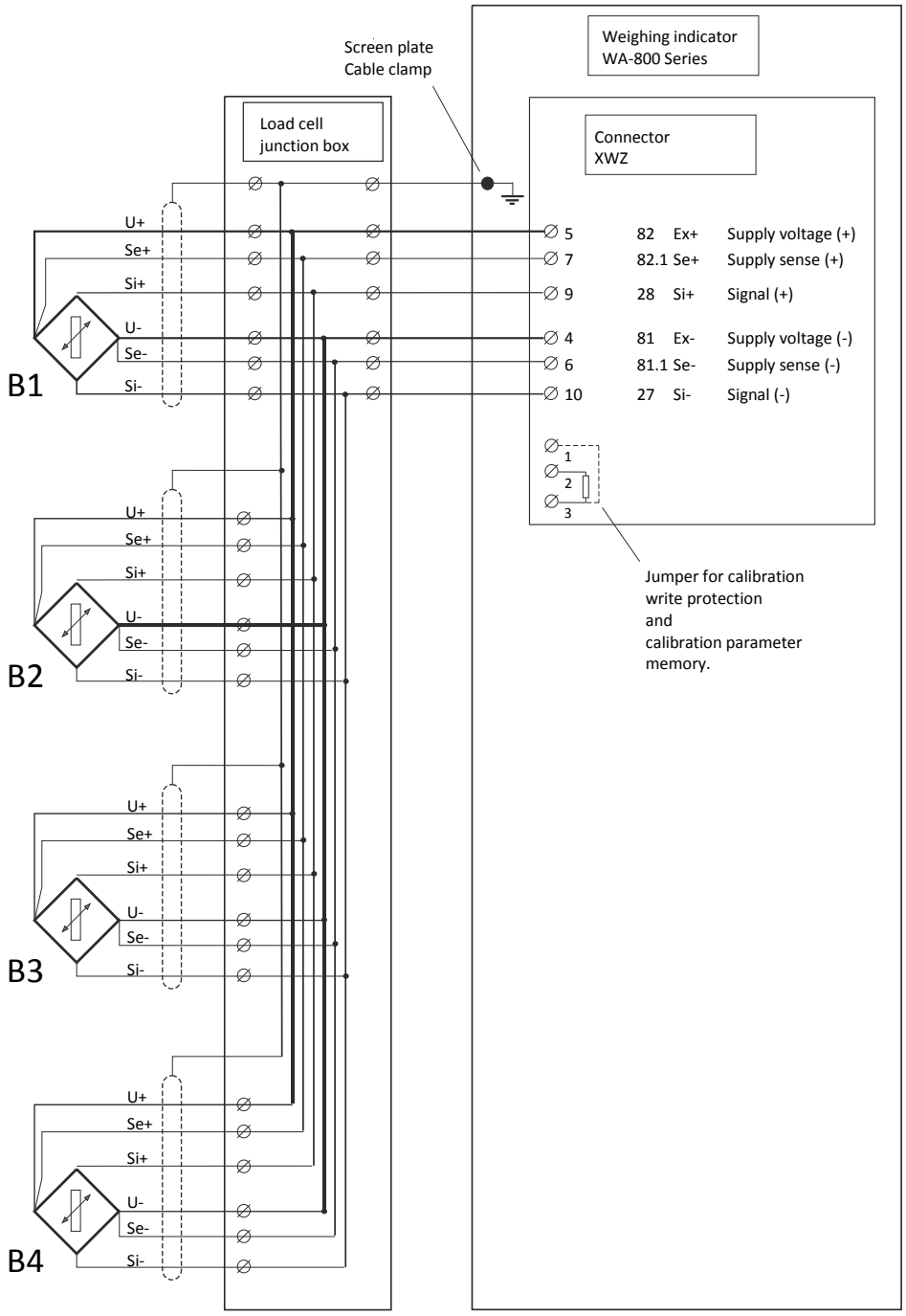


Fig. 7. Load cell connection

If the scale design provides the ground connection for a load cell body, it is not necessary to use other earthing cable.

It is not necessary to connect the cable screen in junction box terminal (if available) if load cells shields are connected to the load cell body. In this case, the shield is earthed via the load cell body.

Table 4: Load cell conductor colors

Load Cell Type	***Supply + U +***	***Sense + Se +***	***Supply - U -***	***Sense - Se -***	***Signal + Si +***	***Signal - Si -***	***Shield***
BA3	Black	--	Blue	--	Red	White	Yellow
BA5	Blue	Green	Black	Gray	White	Red	Shield
BA6	Red	--	White	--	Black	Blue	Shield
BC5	Blue	Green	Black	Gray	White	Red	Shield
BC6	Brown	Gray	Green	Pink	Yellow	White	Yellow / Green
RC2	Black	--	Blue	--	Red	White	Yellow / Green
TB5	Blue	Green	Black	Gray	White	Red	Shield

Table 5: Cable extension connection boxes for load cells

Box type	***Connection***	***U +***	***Se +***	***U -***	***Se -***	***Si +***	***Si -***	***Shield***
AR-1	Soldering	1	2	3	4	5	6	7
KR-1	Screw	1	2	3	4	5	6	7

Table 6: Parallel connected load cells connection boxes

Box type	***Connection***	***U +***	***Se +***	***U -***	***Se -***	***Si +***	***Si -***	***Shield***
KR-54	Screw	1	2	3	4	5	6	7
KR-41A	Screw	1	2	3	4	5	6	7
KR-41B	Screw	1	2	3	4	5	6	7

Table 7: Load cell connection cables

Cable type	***Outer Diameter [mm]***
LiYCY (TP) 3x2x0,14	5,8
LiYCY (TP) 3x2x0,25	7,1
LiYCY (TP) 3x2x0,5	8,7
JAMAK 4x(2+1)x0,5	9,5
DATAJAMAK 4x(2+1)x0,24	9,0

Table 8: LiYCY conductor colors

LiYCY conductor colors		
Pair no	*a-conductor*	*b-conductor*
1	white	brown
2	green	yellow
3	gray	pink

Table 9: JAMAK and DATAJAMAK conductor colors

JAMAK and DATAJAMAK conductor colors		
Type	*a-conductor*	*b-conductor*
JAMAK	blue	red
DATAJAMAK	white	orange

5. INTERFACES

5.1. Terminals / connectors

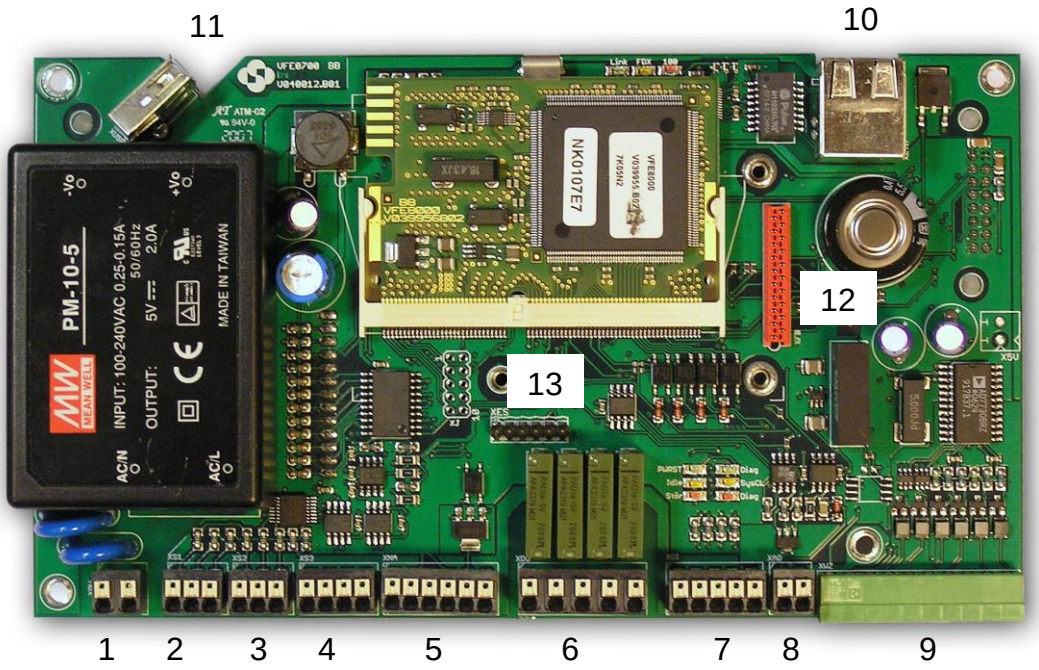


Fig. 8. Interface terminals.

Note: Some indicators don't have all interfaces.

Table 10: WA-800 Connectors

	Connector	***Interface***	***Isolation***
1	XPW	Voltage supply (mains voltage)	Galvanical isolation
2	XS1	Serial interface S1 RS-232	Not isolated
3	XS2	Serial interface S2 RS-232	Not isolated
4	XS3	Serial interface S3 RS-485	Not isolated
5	XNA	Namur input/pulse output	Not isolated
6	XDO	Relay outputs	Galvanic isolation
7	XDI	Digital inputs	Optical isolation
8	XAO	Analog output	Not isolated
9	XWZ	Load cell connection	Not isolated
10	XETH	Ethernet Network interface	Galvanic isolation
11	XUSB	USB interface	Not isolated
12	XFB	Extension connector for fieldbus modules	Not isolated (fieldbus is isolated)
13	XES	L-F-T memory	

HUOM: **<u>Not isolated</u> interfaces 0V (gnd) is connected to unit's frame, earth grounded.**

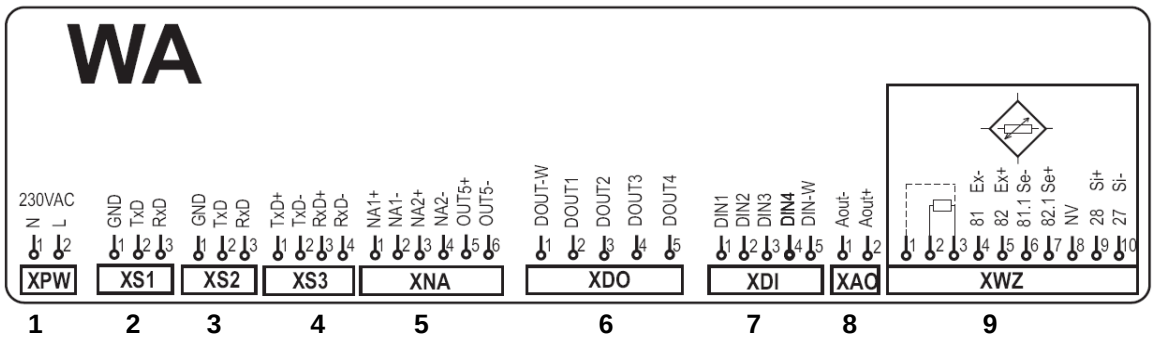


Fig. 9. WA-800 Indicator Interface terminals

5.2. Load cell connection

5.2.1. Load cell cable connector / Calibration data memory, dongle

The dongle chip for adjusting and calibrating data has to be mounted before connecting the load cell cable.

- The dongle chip is enclosed in the delivery.
- Pin 1 of the chip is removed (refer to the Figure 9; the flat side is on top).
- Connect dongle chip pins 2 and 3 to the load cell interface plug (refer to the Figure 10; the flat side is on top)
- The parameters are write-protected with a jumper between pins 1 and 3.

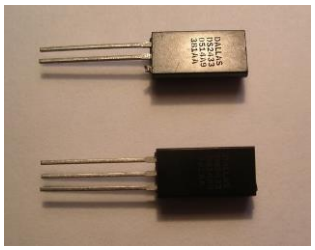


Fig. 10. Calibration data memory, dongle

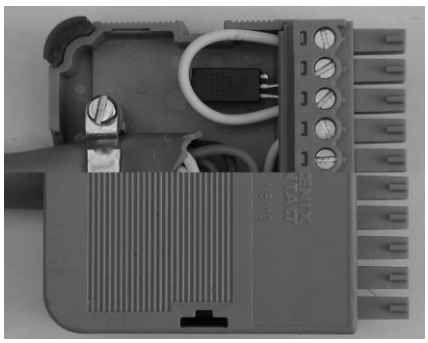
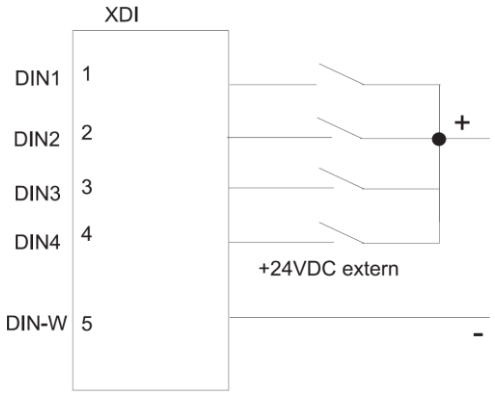


Fig. 11. Dongle connection (write protected)

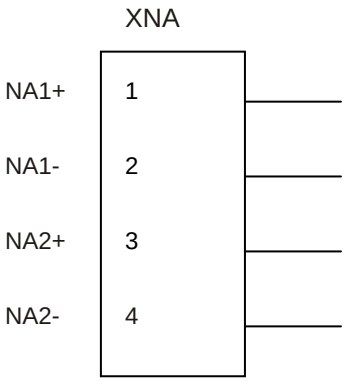
5.3. Digital inputs



- 24VDC (18-36VDC)
- Iin typical 5mA
- Optoisolated
- Recommendation, Shielded connection cable

Fig. 12. Input terminal XDI wiring diagram.

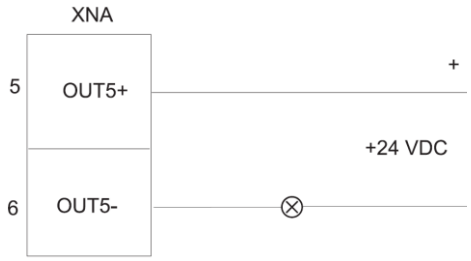
5.4. Namur inputs



- max. 5 V
- Non isolated
- Recommendation, Shielded connection cable

Fig. 13. Namur input terminal XNA wiring diagram.

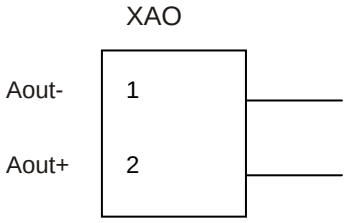
5.5. Impulse output



- 24 VDC (18-36 VDC)
- Iout max. 50 mA
- Optoisolated
- Recommendation, Shielded connection cable

Fig. 14. Impuls output terminal XNA wiring diagram.

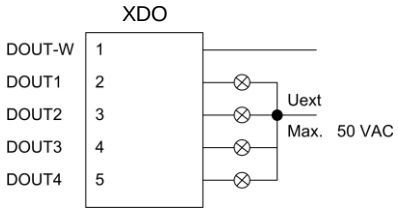
5.6. Analog Output



- 0/4 – 20 mA output
- max. 500 Ω
- 12-bit
- Non isolated
- Shielded connection cable

Fig. 15. Analog output terminal XAO wiring diagram.

5.7. Relay outputs



- Relay output
- Contact max. 60 W 50 VAC / 30 VDC
- Isolated
- Recommendation, Shielded connection cable

Fig. 16. Relay output terminal XDO wiring diagram.

5.8. Serial interfaces S1, S2, S3

Serial interface settings are selectable individually.
Interfaces S1, S2, S3 are not isolated.

Table 11: Serial interface setup

Baud Rate [baud]	*600 - 115200*
Bit	7, 8
Parity	OFF, ON / ODD, ON / EVEN
Stop bit	1, 2
X-ON, X-OFF	On, Off

5.8.1. Serial interface S1 and S2 (RS-232)

Terminals XS1, XS2 serial interfaces are permanent RS-232 interfaces.
Shielded connection cable max. length 15m.

Table 12: Serial interface S1, S2, connection

XS1, XS2		*Printer D-9*	*Printer D-25*
Pin	*Interface*	*PC D-9*	
1	GND (0V)	GND = 5	GND = 7
2	TxD	RxD = 2	RxD = 3
3	RxD	TxD = 3	TxD = 2

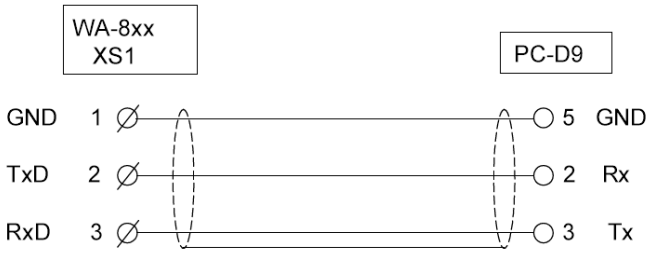


Fig. 17. Connector XS1 connection cable to PC.

5.8.2. Serial interface S3 (RS-485)

Terminal XS3 serial interface is permanent RS-485 2- or 4-wire interface.
Shielded connection cable.

Table 13: Serial interface S3 cable length

Baud rate [baud]	*Max. cable length [m]*
100 - 9600	1200
19200	600
38400	300

RS-485 2-wire connection

Contacts 1-3 and 2-4 are jumpered for RS-485 2-wire interface. An additional 120 Ω bus termination resistor should be mounted both end of the bus.

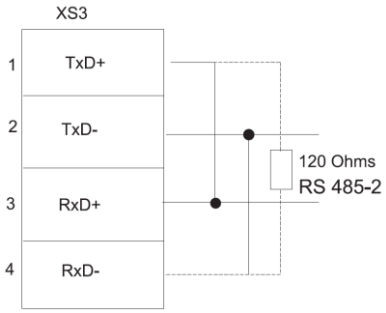


Fig. 18. S3 as RS-485 2-wire wiring diagram.

RS-485 4-wire connection

RS-485 4-wire termination resistor 120Ω is connected to the receive interface (PIN 3-4).

5.9. Ethernet interface

- Connector XETH, RJ45
- 10/100 Mbit/s
- Isolated

For fixed installation Shielded and twisted pair cable.

Table 14: Ethernet cable

Category	*Speed [Mbps]*	*Cable Length max.*	*Cable type*
CAT 5	100	100m	Shielded and twisted pair
CAT 5e	100	100m	Shielded and twisted pair
CAT 6	1000	100m	Shielded and twisted pair

5.10. USB interface

- For PC keyboard
- Non isolated

6. OPTIONS

6.1. Legal-for-trade memory

6.1.1. L-F-T memory VMM20490 installing

- Attach the module to the XES connector (figure 18).
- It makes sense to safeguard the module with some hot-melt adhesive (glue).
- If a fieldbus card is used simultaneously with the legal-for-trade memory, the LEDs on the bus card will push the memory board aside a little, this is normal. The L-F-T memory fits under the field bus card and the hot-melt adhesive is not required

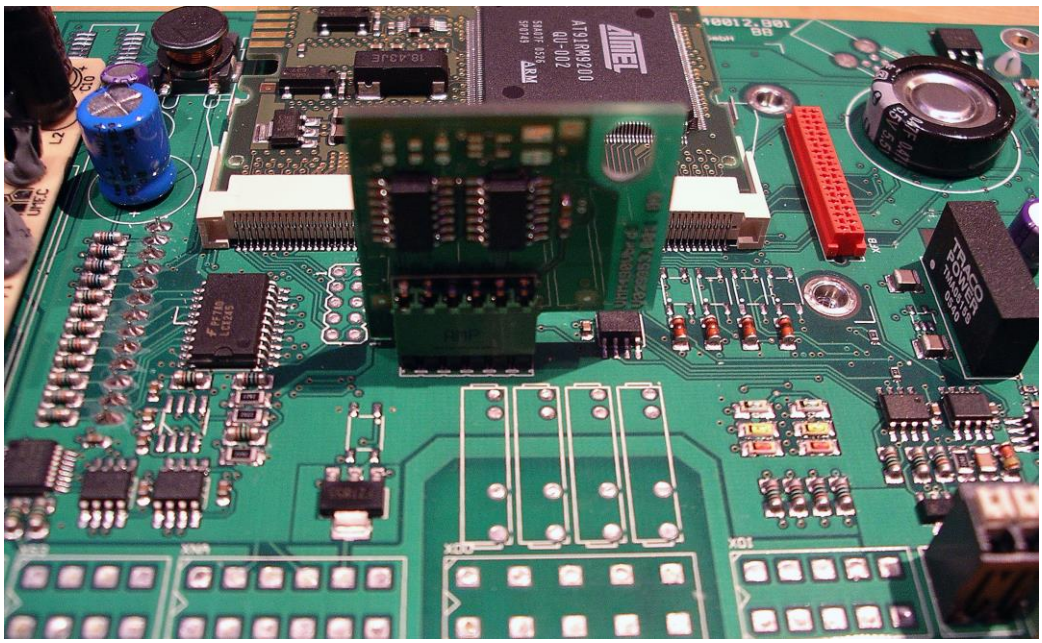


Fig. 19. L-F-T Memory VMM20490

.

6.1.2. L-F-T memory VMM20407 installing

- Attach the module to the XES connector (figure 19).
- If a fieldbus card is used simultaneously with the legal-for-trade memory, the legal-for-trade memory is protected by the bus card. The fastening bolt for the bus card has to be replaced with the plastic bolt that is included in the legal-for-trade memory marked with the arrow, Figure 19.

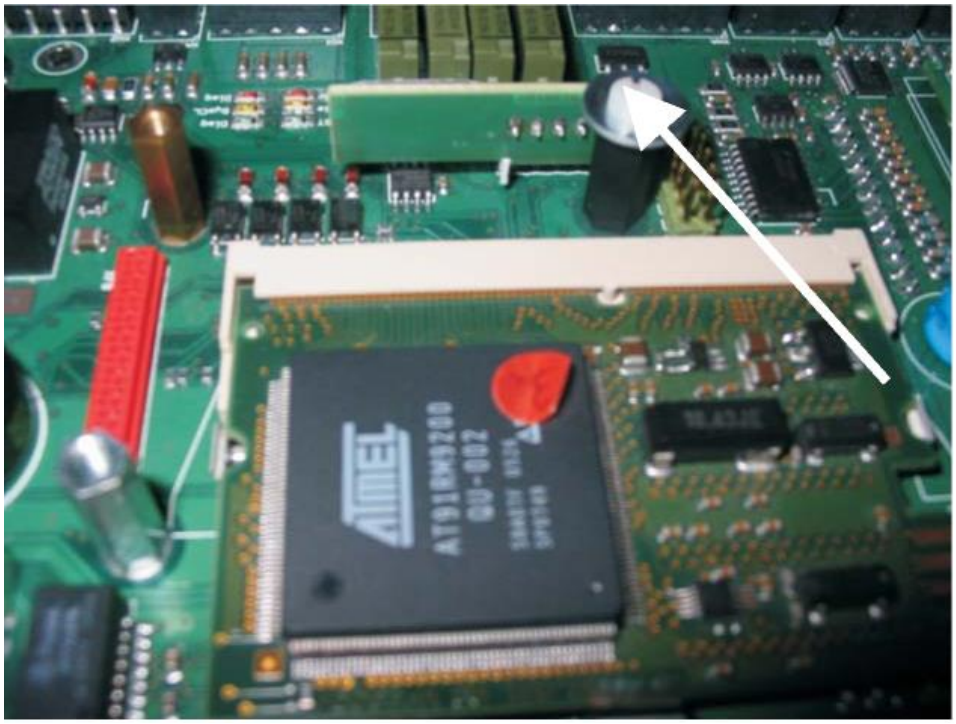


Fig. 20. L-F-T Memory VMM20407

6.2. Remote (PC) keyboard

The remote keyboard allows a remote keyboard to be operated in the same manner as the fixed keyboard. The entry of α/n characters is considerably easier on the remote keyboard.

Fig. 21. PC Keyboard

6.3. Fieldbus interface modules

6.3.1. General Information

All fieldbus interfaces are cards, which have been inserted into the mainboard.

Certain fieldbus systems may have some restrictions, such as length of cable and bus termination. Please refer to the technical specifications of the bus system used for further details. To provide the optimum EMC interference safety we recommend that those cables specified by the individual fieldbuses be used.

The VPB 020, VPB 8020, VCB 020, VCB 8020 and VSS 021 bus coupling modules are fastened to the CPU board with 3 screws each (component side upwards). It is electrically connected via the ribbon cable. All of the parts needed for subsequent mounting are attached to the coupling module.

6.3.2. Installing Fieldbus Interface

- Mount the fieldbus card as follows:

- Disconnect WA-800 indicator from the power supply.
- Open the housing.

Note: Don't open the housing when power is switch on.

- Insert the spacer bolts onto the mainboard. The bolts are contained in the circuit board assembly kit.
- Please note: If the bus cards are fitted with configuration jumpers, these should be set before the card is installed.
- Plug the fieldbus card ribbon cable into the XFB connector on the mainboard and secure it with three screws.
- Close up the device.

6.3.3. Profibus-DP modules

To WA-800 weighing indicator are available two different Profibus-DP modules, old VPB 020 and new VPB 8020.

- VPB 8020 module replaces old VPB 020 module.
- Both modules have their own gsd-file.
- VPB 020 module can be replaced with VPB 8020 module, but VPB 8020 can't be replaced with VPB 020 module.
- VPB 8020 module has same functions and works with same gsd-file as VPB 020.
- New VPB 8020 modules additional features operates with VPB 8020 modules own gsd-file.
- More information is available at the manual *Communication Manual WA-800 Product Family*.

VPB 020
With uncased circuit

VPB 020
With enclosed circuit

VPB 8020

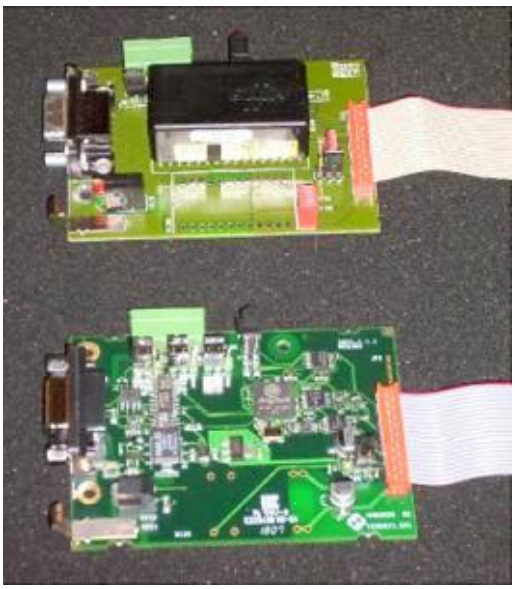


Fig. 22. Profibus-DP modules VPB 8020 and VPB 020.

6.3.4. Profibus-DP VPB 020 module

This module can be attached to the main board to provide an interface to the PROFIBUS-DP. This module is designed and certified as per DIN 19245 or Part 2 of EN 50170 and has automatic baudrate identification to 12 Mbit/s (12 Mbps).

The following cable lengths may not be exceeded for the entire bus when using cable type "A":

Table 15: Profibus-DP VPB020 cable length

Speed [kbit/s]	*Max. cable length [m]*
12000, 6000,3000	100
1500	200
500	400
187.5	1000

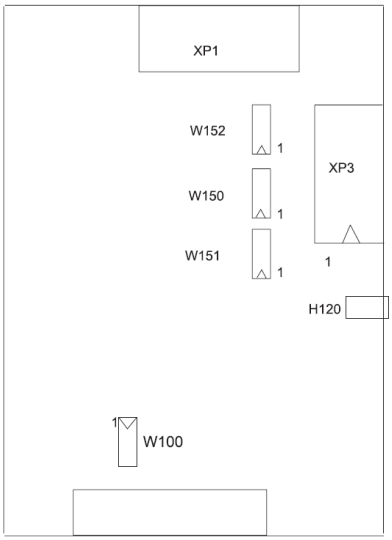


Fig. 23. VPB 020 connectors and jumpers.

Note! W100 has to be in position 2-3 to operate.

6.3.4.1. VPB 020 leds and connectors

The circuit board has two connectors for connecting the bus. You can use either the XP3 plug or the XP1 (HD-9 pole). The leds H110 and H120 indicates proper bus operation and they have same function.

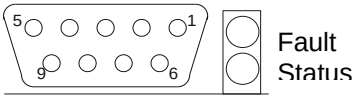


Fig. 24. VPB 020 leds and connector XP1

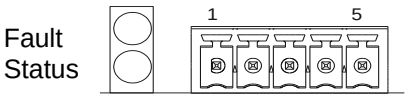


Fig. 25. VPB 020 leds and connector XP3

Fault led, red: Bus don't work, bus is broken or module is broken.
Status led, green: Bus is OK, (On-line).
Status led, flashing green: Module configured, no on-line.

Pin assignment:

XP1 Pin No.	XP3 Pin No.	
3	1	RxD/TxD-P*
8	2	RxD/TxD-N**
5	3	DGND
6	4	VP
1	5	screen***

* : = -P = B
** : = -N = A
*** : The screen should not be placed on the plug, but on the cable clamp.

6.3.4.2. Profibus-DP Bus terminating

The first and last units on the PROFIBUS-DP fieldbus have to have a bus termination. You can do this by setting jumpers W150, W151 and W152 to 1-2. At position 2-3 bus is not terminated.

If the last actively terminated slave is removed from the bus, this may cause the entire bus to disturbed. This fault occurs particularly often when using alternating scales. This problem can be avoided by using a separate active bus termination such as the one offered by Siemens under order number 6ES7 972-0DA00-0AA0.

6.3.4.3. Profibus-DP Address settings

Addresses are set by parameters.

6.3.4.4. Profibus-DP cable

Instructions for setting up external wiring and preventing malfunctions can be found in the Profibus Guideline of the Profibus User Organization (PNO).

6.3.4.5. Profibus-DP gsd file

The Profibus standard DIN 19245 part 3 defines a device master data file (.gsd file). This file is supplied with the device.

6.3.4.6. Profibus-DP Fieldbus monitoring

Since output contacts are set and feed unit drives can be triggered via the fieldbus interface, any breakdown in communication has to be identified and the corresponding outputs have to be put into the safe state. Monitoring is active when the set timeout time is 0 and a fieldbus card is connected.

If communication to a fieldbus master breaks down, any charging in process is stopped after the time-out time and a fault is indicated. After resuming communication, the fault indication is automatically cleared.

6.3.5. Profibus-DP VPB 8020 module

This module can be attached to the main board to provide an interface to the PROFIBUS-DP. This module is designed and certified as per DIN 19245 or Part 2 of EN 50170 and has automatic baudrate identification to 12 Mbit/s (12 Mbps).

The following cable lengths may not be exceeded for the entire bus when using cable type "A":

Table 16: Profibus-DP VPB8020 cable length

Speed [kbit/s]	*Max. cable length [m]*
12000, 6000,3000	100
1500	200
500	400
187.5	1000

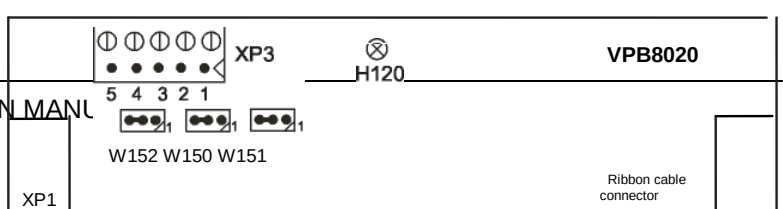


Fig. 26. VPB 8020 connectors and jumpers.

Note! W100 has to be in position 2-3.

The circuit board has two connectors for connecting the bus. You can use either the XP3 plug or the XP1 (HD-9 pole).

6.3.5.1. Profibus-DP Bus terminating

The first and last units on the PROFIBUS-DP fieldbus have to have a bus termination. You can do this by setting jumpers W150, W151 and W152 to 1-2. At position 2-3 bus is not terminated.

If the last actively terminated slave is removed from the bus, this may cause the entire bus to disturbed. This fault occurs particularly often when using alternating scales. This problem can be avoided by using a separate active bus termination such as the one offered by Siemens under order number 6ES7 972-0DA00-0AA0.

6.3.5.2. Profibus-DP Address settings

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Since output contacts are set and feed unit drives can be triggered via the fieldbus interface, any breakdown in communication has to be identified and the corresponding outputs have to be put into the safe state. Monitoring is active when the set timeout time is 0 and a fieldbus card is connected.

If communication to a fieldbus master breaks down, any charging in process is stopped after the time-out time and a fault is indicated. After resuming communication, the fault indication is automatically cleared.

6.3.5.6. VPB 8020 leds and connectors

Fig. 27. VPB 8020 leds and connector XP1

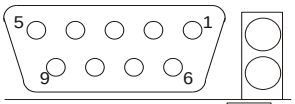
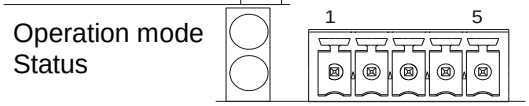


Fig. 28. VPB 8020 leds and connector XP3



On the Profibus connection (VPB 8020), the LED is lit. Leds H110 and H120 have same function.

Table 17: VPB 8020 Fieldbus Operation Mode

State	***Indication***
Off	Not online / No power
Green	On-line, Data exchange
Flashing Green	On-line, clear
Flashing Red (1 Hz)	Parameterization error
Flashing Red (2 Hz)	PROFIBUS Configuration error

Table 18: VPB 8020 Module Status

Status	***Indication***
Off	Not power or not initialized
Green	Initialized
Flashing Green	Initialized, diagnostic event(s) present
Red	Exception error

Table 19: VPB 8020 Connectors XP1 / XP3 pin assignment

Pin	***Signal*** *(XP1 9-pin Sub-D-female)*	***Signal*** *(XP3, 5-pin Phoenix MSTB 3.5 max.1.5mm²)*
1	-	B-Line, Positive RS485 RxD/TxD *
2	-	A-Line, Negative RS485 RxD/TxD **
3	B-Line, Positive RS485 RxD/TxD *	GND BUS
4	RTS, Request To Send	+5V BUS
5	GND BUS	Shielding
6	+5V BUS	-
7	-	-
8	A-Line, Negative RS485 RxD/TxD **	-
9	-	-
Housing	Bus Cable Shield	-

* Cable red wire
** Cable green wire

Table 20: VPB 8020 Module specifications

Interface	***Specification***
Module power supply	5V DC internal
Module current consumption	Max 310mA
Fieldbus plug connectors	5-Pin Phoenix MSTB 3.5 max. 1.5mm² 9-pin Sub-D-female

6.3.6. DeviceNet VCB 020 module

VCB 020 module connects the WA-800 series indicator to DeviceNet interface.

The VCB 020 card has two bus connectors. Both XC1 and XC3 plugs can be used.

Pin No.	
1	0V
2	CAN-
3	Screen (put it on the cable inlet and not on the XC plug)
4	CAN+
5	+24V

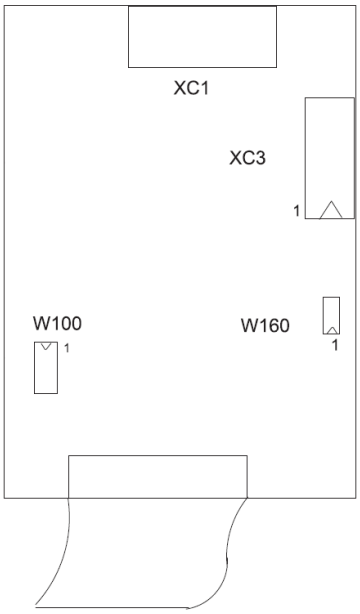


Fig. 29. Position of connectors and jumpers VCB 020.

Note! W100 has to be in position 2-3.

6.3.6.1. DeviceNet Bus terminating

DeviceNet (CAN) the first and last units on the bus have to have a bus termination. Set the jumper W160 to position 1-2. At position 2-3 bus is not terminated.

6.3.6.2. DeviceNet Baud rate and address settings

Both values are set using parameters.

6.3.7. DeviceNet module (VCB8020)

As an option, the module can be fastened on the unit's mainboard to provide an interface to the DeviceNet fieldbus.

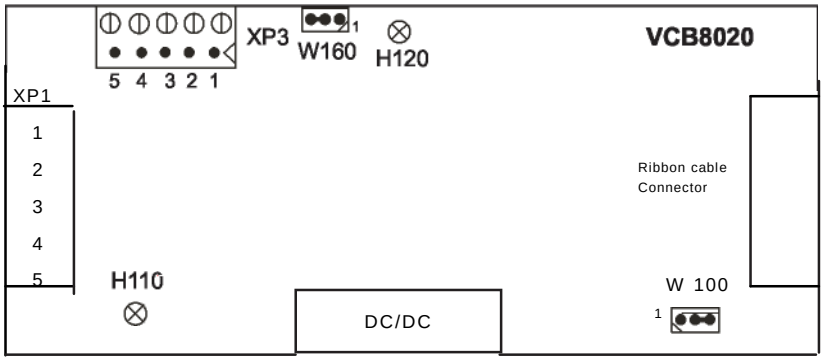


Fig. 30. Position of connectors and jumpers VCB 8020

Note! W100 has to be in position 2-3.

The VCB 020 card has two bus connectors. Both XP1 and XP3 plugs can be used. Pin assignment at table 23.

6.3.7.1. DeviceNet Bus terminating

The bus termination resistances must be activated at the first and last station of the bus. This is done by applying the W160 jumper to the position 1-2. At position 2-3 bus is not terminated.

6.3.7.2. DeviceNet Baud rate and address settings

Both values are set using parameters.

6.3.7.3. VCB8020 Leds and connector XP1

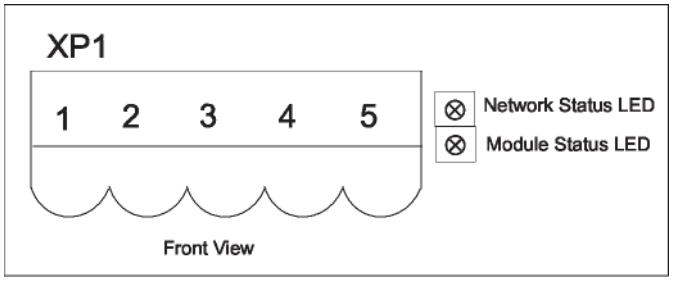


Fig. 31. VCB 8020 leds and connector XP1

On the DeviceNet connection VCB 8020, the LED is lit.

Table 21: VCB8020 Network status

Status	***Indication***
Off	Not online / No power
Green	On-line, one or more connections are established
Flashing Green (1 Hz)	On-line, no connections established
red	Critical link failure
Flashing Red (1 Hz)	One of more connection timed-out
Alternating Red/Green	Self test

Table 22: VCB8020 Module Status LED H110

Status	***Indication***
Off	No power
Green	Operating in normal condition
Flashing Green (1 Hz)	Missing or incomplete configuration, device needs commissioning
Red	Unrecoverable Fault(s)
Flashing Red (1 Hz)	Recoverable (Fault(s)
Alternating Red/Greed	Self test

Table 23: VCB8020 Connectors XP1 / XP3 pin assignment

Pin	***Signal***
3	Screening
4	CAN_H
2	CAN_L
1	V-
5	V+

Table 24: VCB8020 Module Specifications

Interface	***Specification***
Module power supply	5V DC internal
Module current consumption	Max 250mA
Fieldbus plug connectors	Phoenix MSTB 5 max. 2.5mm^2 Phoenix MSTB 5 max. 1.5mm^2

6.4. I/O-Extension modules (ICP-modules)

WA-800 I/O can be extended with ICP-modules.
Module is mounted outside of the WA-800 and requires power 24 VDC.
Module is connected to WA-800 with RS-485 2-wire interface.
Connected modules are determined by WA-800 software version.

Table 25: ICP I/O-modules

ICP Modules	*IN*	*OUT*
7063D	8 DI	3 DO Relay 250VAC/5A, 30VDC/5A
7067D		7 DO Relay 120VAC/0,5A, 30VDC/1A
7021		1 Analog Out 12-bit, 0-10V, 0/4-20mA
7014D	1 Analog In	

Note: I-7067D relay outputs can be loaded with max. 120VAC.

ICP-modules interface parameters are fixed.

- RS-485
- 9600 Baud
- 8 bit
- no parity
- 1 stop bit

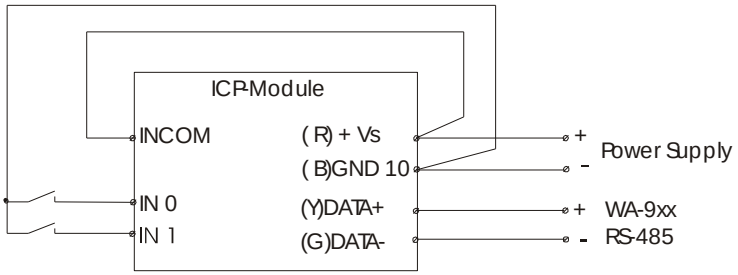


Fig. 32. ICP-module power, RS-485 and connection

Voltage is available across inputs with open switch (logical signal), and check LEDs light.

Note: ICP-modules inputs have common positive voltage.

Under unfavorable conditions, communication errors can occur in spite of proper connection of the ICP modules. The use of a bus termination offers a reliable remedy as shown at figure below. When using an ICP7014 D module circuit is highly recommended.

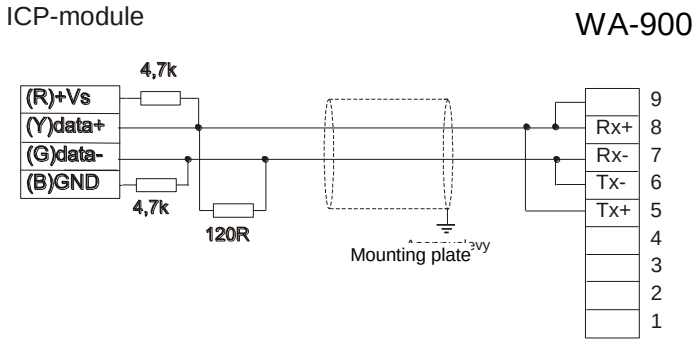


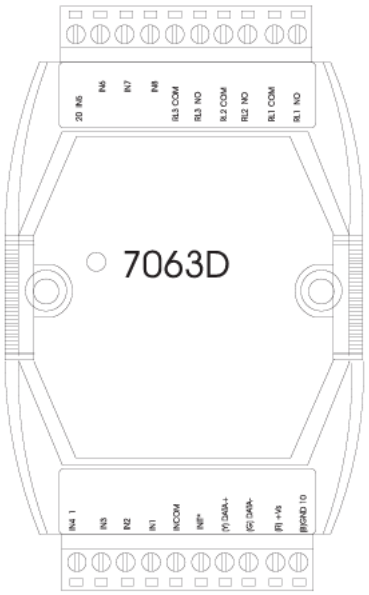
Fig. 33. ICP-module serial interface connection

6.4.1. ICP-module I-7063D

8 inputs, 3 relay outputs

Technical specifications

I-7063D	
Relay outputs	8
Load max.	5A@250VAC 5A@30VDC
Switching time	8ms max.
Drop time	3ms max.
Min. Life	100000 switching operations
Inputs	8
Isolation	3750Vrms
Digital 0	+1V max
Digital I	+4 …+30V
Input Impedance	3 kohm
Power supply	+10…30VDC
Consumption	1.5 W

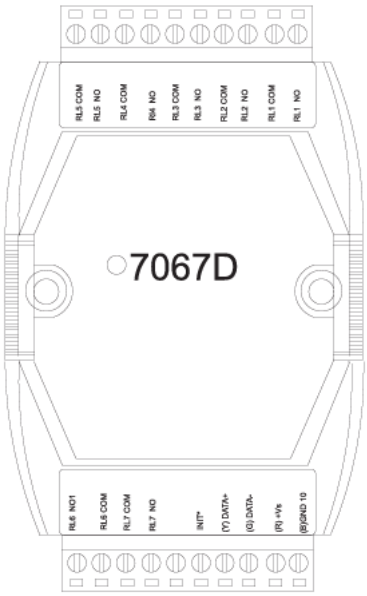


6.4.2. ICP-module I-7067D

7 relay outputs

Technical specifications

I-7067D	
Relay outputs	7
Load max.	5A@120VAC 1.0A@24VDC
Switching time	5ms max.
Drop time	2ms max.
Min. Life	100000 switching operations
Power supply	+10…30VDC
Consumption	1.5 W

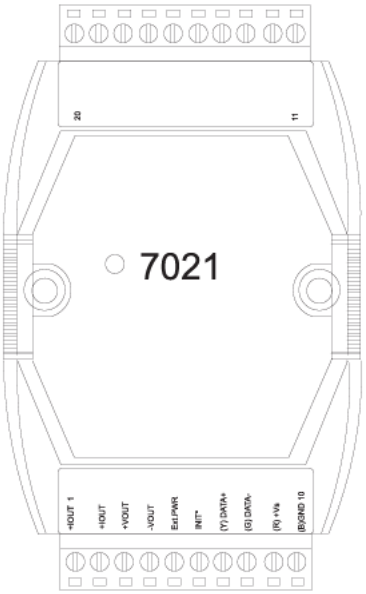


6.4.3. ICP-module I-7021

Analog output

Technical specifications

I-7021	
Analog output	
Channels	1
Interface type	mA, V
Accuracy	±0.1% , FSR
Zero drift: voltage output	±30µV/°C, max.
Zero drift: current output	±0.2µA/°C, max.
Span temp. coefficient	±25ppm/°C, max.
Voltage output Load	10mA , max
Current output Load internal voltage	500 ohm
Current output Load external voltage	1050 ohm
Isolation	3000VDC
Power supply	+10...30VDC
Consumption	1.8 W



I-7021 Jumper settings

To select maximum output load, set jumper JP1 accordingly:

- Internal position: (default) 500 ohms max. load.
- External position: 1050 ohms max. load.

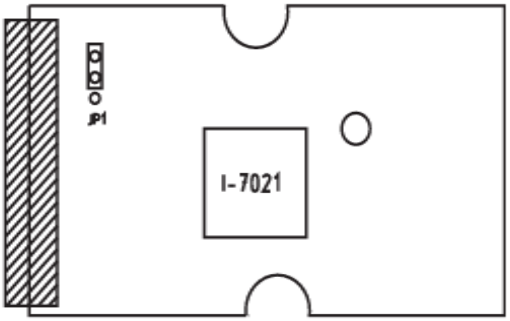


Fig. 34. I-7021 Output load setting

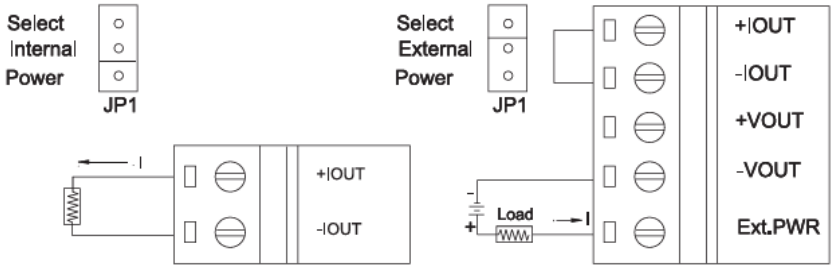


Fig. 35. I-7021 current output connection

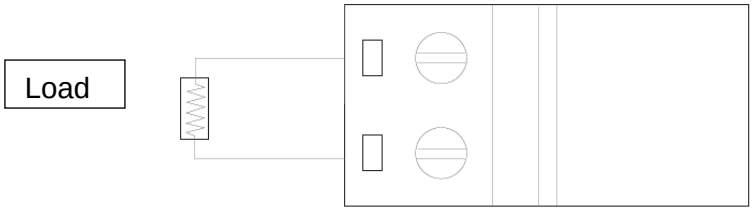


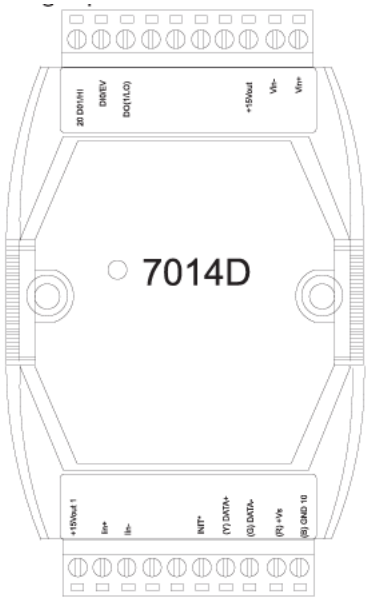
Fig. 36. I-7021 voltage output connection

6.4.4. ICP-module I-7014D

Analog input

Technical specifications

I-7014D	
Analog output	
Channels	1
Interface type	mV / V / mA
Sample rate	10/ sec.
Bandwith	5.24 Hz
Accuracy	±0.05%
Zeropoint drift	20µV/°C
Span drift	±25ppm/°C , max.
Input Impedance: voltage	30 kohm
Input Impedance: current	125 ohm
Isolation	3000VDC
Excitation voltage output rating	30mA@15V
LED display	4½ decades
Power supply	+10...30VDC
Consumption	1.9 W



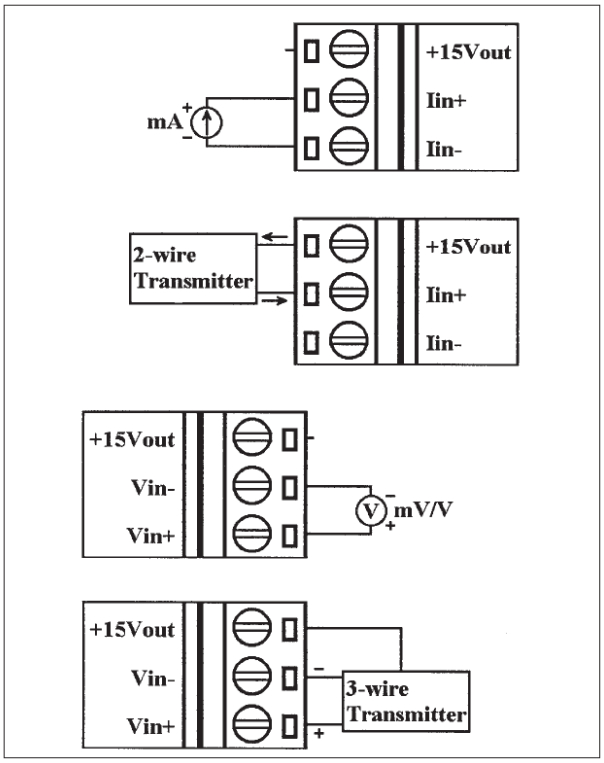


Fig. 37. I-7014D wiring

6.4.5. Dimension of the ICP-modules

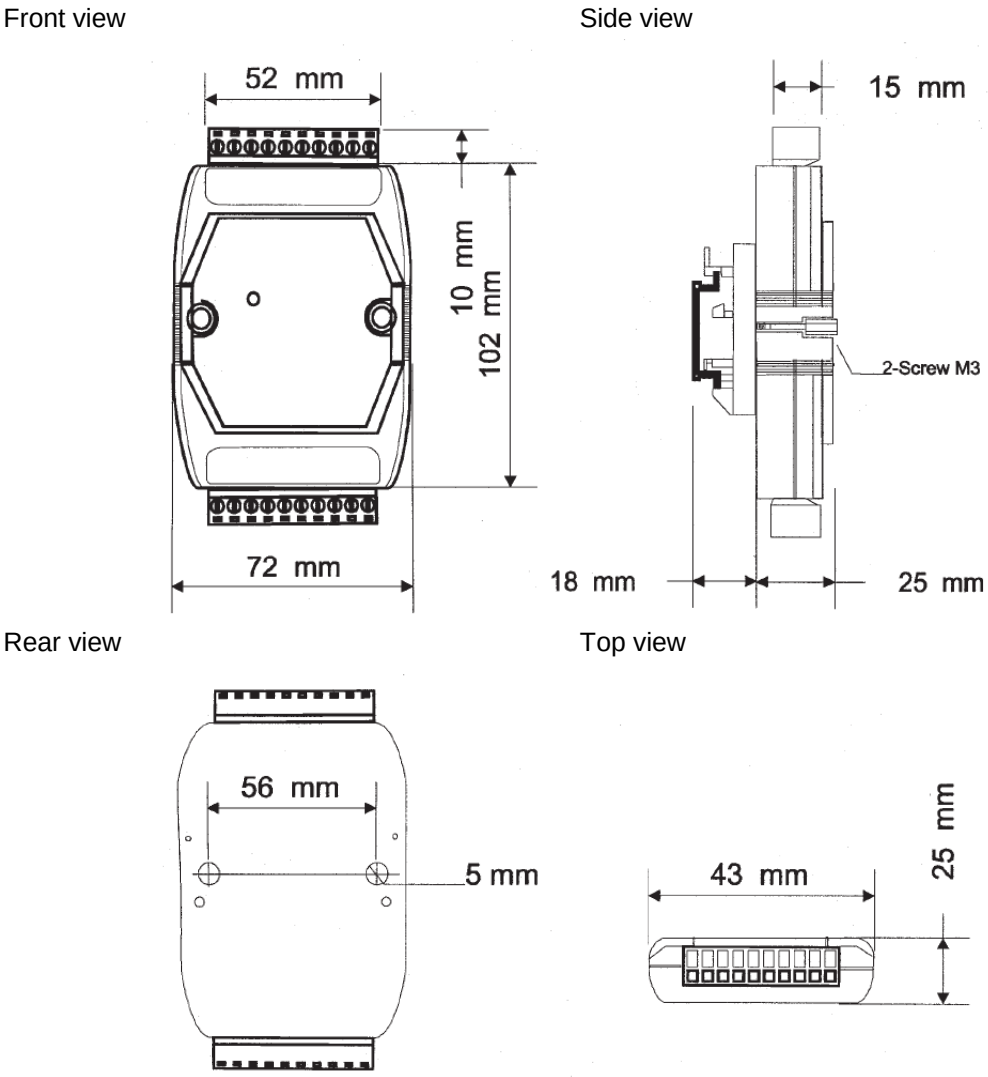


Fig. 38. Dimensions of the ICP-modules

6.5. Belt scale speed transducers

6.5.1. Speed transducer FGA 20 RSLE

Runner wheel. Material No. V0010975.

Fig. 39. Speed transducer FGA 20 RSLE

6.5.2. Speed transducer FGA 24 A

A transducer for mounting on the tail pulley shaft of the conveyor. Material No. V0010974

Fig. 40. Speed transducer FGA 24 A

7. CALIBRATION AND SIGNS

7.1. Calibration and signs

L-F-T scales have to fix *Descriptive plate*. The plate has markings as instructions below. A marking depends on scale type. Notified body fix the other EC-directive required marks and seals to L-F-T scales. A label locates at the front panel and or side of the housing.

The Legal-for-Trade parameters and the results of adjustment are stored in the scale connector that is called a dongle. The benefit is the fact that it does not have to be adjusted again after exchanging or changing the electronic or display unit. Manipulating the dongle causes a loss of adjustment and L-F-T scale becomes non L-F-T scale.

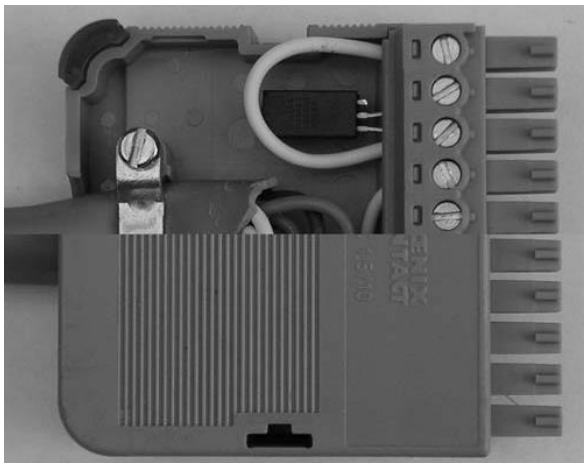


Fig. 41. Calibration data memory, Dongle

Please do the following for configuration and adjustment:

1. Switch the mains voltage off.
2. Open the system and the dongle casing by unhinging on the side with a screwdriver.

   Note: Don't open the housing when power is switch on.

3. Remove the wire jumper between pins 1 and 3 of the connector (figure 38).
4. Do calibration as described in the service manual.
5. Set jumper back between pins 1 and 3. The relevant data are writing protected when a wire jumper is set between clips 1 and 3.
6. Clip the dongle's plastic casing components together.
7. If indicator is L-F-T, tape the calibration seal stamp over the casing seam.
8. The indicator casing is not sealed.
9. A descriptive stamping plate is placed on the outside of the casing - preferably on the front side above the keyboard.
10. If indicator is L-F-T and the descriptive stamping plate is not made of material that is destroyed when removed, it has to be protected by sealing stamp.

7.1.1. Stamping plates:

7.1.1.1. Non-Automatic Weighing Instrument (NAWI), EC-directive 90/384/EEC

Standard EN45501, (OIML R76)

Non-Automatic Weighing Instrument directive, standard and type-approval certificate orders to fix to L-F-T scales *Descriptive plate* and M-sticker in green sticker Capital letter M

- CE mark with the year in which it was affixed.
- **(III)** The accuracy class of the scale (III or IIII)
- Identification number of the EU-notified body (0424)
- EC-type-approval certificate number (D07-09-022)
- Temperature range (-10°C/+40°C)
- Id: Scale serial number (L0012345)
- Type: Scale type
- Max= Maximum capacity
- Min= Minimum capacity
- e= Verification interval or d= non L-F-T scale

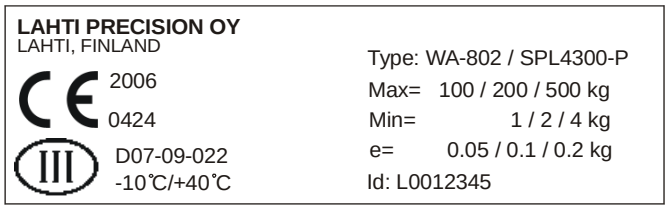


Fig. 42. NAWI descriptive plate.

Fig. 43. NAWI Green sticker

7.1.1.2. Automatic Gravimetric Filling Instrument, EC-directive 2004/22/EC

Standard OIML R61

Automatic Gravimetric Filling Instrument directive, standard and type-approval certificate orders to fix to L-F-T scales *Descriptive plate* and additional extra label.

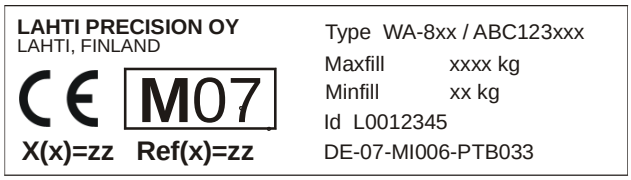


Fig. 44. Automatic gravimetric filling instrument descriptive plate.

- Manufacture and address
- CE Myy where yy is the last two digits of the year in which it was affixed (CE07 was affixed in 2007).
- X(x)= Operational accuracy class (x)= 0.2 , 0.5 or 1
- Ref(x)= Reference accuracy class ((x)= ≤ 2 in the form $1x10^k$,$2x10^k$, $5x10^k$, where k is negative whole number or zero
- Type: Scale type
- Maxfill Maximum filling
- Minfill Minimum filling
- Id: Scale serial number (L0012345)
- EC-type-approval certificate number (DE-07-MI006-PTB033)

Additional markings

Fig. 45. Automatic gravimetric filling instrument additional plate.

- Max Maximum capacity
- Min Minimum capacity
- d= Scale interval
- T= - Maximum subtractive tare
- Max rate: load / minute
- Tamb: Temperature range (-10°C/+40°C)
- Humidity: ≤85% at 40°C, not condensing

7.1.1.3. Discontinous Automatic Totaliser, EC-directive 2004/22/EC

Standard OIML R107

Discontinous Automatic Totaliser directive, standard and type-approval certificate orders to fix to L-F-T scales *Descriptive plate* and additional extra label.

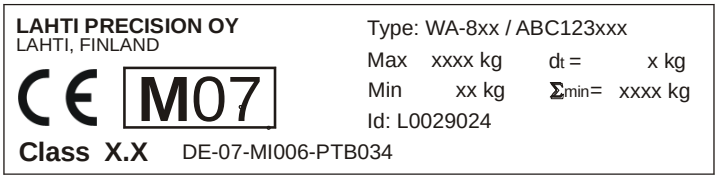


Fig. 46. Discontinous automatic totaliser descriptive plate.

- Manufacture and address
- CE Myy where yy is the last two digits of the year in which it was affixed (CE07 was built in 2007).
- Class X.X = Accuracy class 0.2, 0.5, 1 or 2
- Type: Scale type
- Max Maximum capacity
- Min Minimum capacity

- d_t = Totalization scale interval
- Σ_{min} = Minimum totalized load
- Id: Scale serial number (L0029024)
- EC-type-approval certificate number (DE-07-MI006-PTB034)

Additional markings

Fig. 47. Discontinous automatic totaliser additional plate.

- Tamb: Temperature range (-10°C/+40°C)
- Humidity: ≤85% at 40°C, not condensing

7.1.1.4. Automatic Catchweigher, EC-directive 2004/22/EC

Standard OIML R51

Automatic Catchweigher directive, standard and type-approval certificate orders to fix to L-F-T scales *Descriptive plate* and additional extra label.

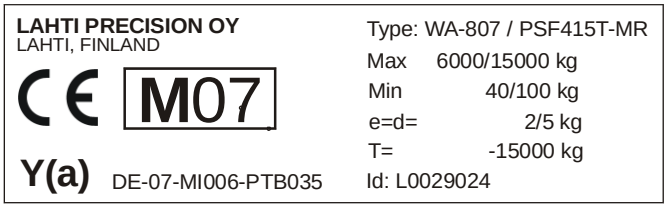


Fig. 48. Automatic catchweigher descriptive plate.

- Manufacture and address
- CE Myy where yy is the last two digits of the year in which it was affixed (CE07 was built in 2007).
- Class Y(a) = Accuracy class Y(a) or Y(b)
- Type: Scale type
- Max Maximum capacity
- Min Minimum capacity
- e=d= Scale interval
- T= - Maximum subtractive tare
- Id: Scale serial number (L0029024)
- EC-type-approval certificate number (DE-07-MI006-PTB035)

Additional markings

Fig. 49. Automatic catchweigher additional plate.

- Tamb: Temperature range (-10°C/+40°C)
- Humidity: ≤85% at 40°C, not condensing

7.1.1.5. Scale identifier label / position number

Scales have scale identifier label.
Every scale has “Scale serial number” and position number when needed.

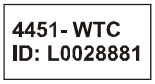


Fig. 50. Scale identifier label / position number

- Position number (4551-WTC)
- Scale identifier number (L0028881)

7.1.1.6. Non L-F-T scales

Non L-F-T scales have same kind plates as L-F-T scales have. At the plates may not have any legal-for-trade (L-F-T) markings.

Forbidden markings at below:

- CE mark with the year in which it was affixed
- The accuracy class of the scale (III or X(x) or Ref(x) or Class X.X or ClassY(a))
- Identification number of the EC-notified body
- EC-type-approval certificate number (D07-09-022 or DE-07-MI006:PTB033 or DE-07-MI006:PTB034 or DE-07-MI006:PTB035)
- Verification interval e=, marking is d=

7.1.1.7. Scale type and electrical information plate

The plate has markings, example figure 32.

- Manufacturer
- Weighing indicator type
- Manufacturer address
- Type: Type number
- Mat No: Lahti Precision material number
- Power: Supply voltage range
  Voltage frequency range
  Max. required power

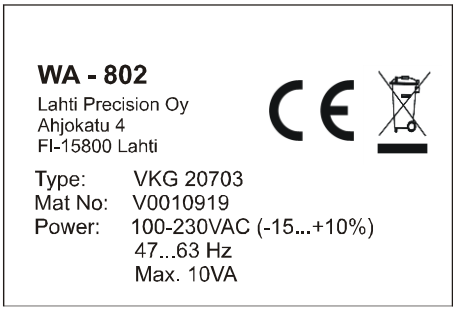


Fig. 51. Material information plate.

8. TECHNICAL DATA

Keyboard WA-801	9 flexible membrane keys
Keyboard WA-802/804/805/806/807	21 flexible membrane keys
Keyboard WA-810	6 flexible membrane keys
Supply voltage WA-801/2/4/5/6/7	85…250 VAC (-15/+10%), 47…63 Hz, max. 10 VA
Supply voltage WA-802r	18…36 VDC
Temperature ranges	Operating temperature: -30…+60 °C Legal for Trade: -20…+40°C Storage temperature: -40…+80 °C
Linearity error	<50 ppm / ºC
Zero stability, T_{Ko}	< 0,06 µV / ºC < 40 ppm / ºC FSR
Temp sensitivity, T_{Kc}	< 40 ppm / ºC
Combined error, F_{comb}	< 100 ppm / ºC
Measuring channels	1
Display	LCD with backlight, 1 row 20 characters, character height 12 mm
Load cell supply voltage	5 VAC
Input signal	0…15mV
Load cell signal minimum	0.6 µV/d
Unit	kg, g, t, lb, N, kN
Number of increments	Legal-for-trade: max. 6000d Multi-range scale: 3 x 4000d Multi-interval scale: 3 x 4000d Resolution unlimited in non-legal-for-trade mode
Taring	To 100% of the weighing range
Zero setting device	Max. 20% settable Automatic zero tracking 0.5d/sec (selectable) Automatic zero setting (selectable)
Load cell interface	Impedance: min. 43 Ω (8 x 350 Ω L/C), max. 4500 Ω Cable length for: 4-wire from junction box: ≤ 40 m/mm² 6-wire from junction box: ≤ 800 m/mm²
Date / time	Real-time clock (RTC), min. 7 days backup
Housing	Desk-top or wall-mount, Protected to IP 65, Stainless steel 1.4301 Top hat rail mounting, Protected to IP20
Digital inputs	4 x optocouplers, 18 - 36 VDC typ. 5 mA 2 x NAMUR, max. 8VDC, not isolated
Relay outputs	4 x Relay, 50 VAC / 30 VDC, max. 60 W, galvanic isolation 1 x optocouplers, 18 – 36 VDC, max. 50 mA, opto isolation
Analog output	1 x 0(4) – 20 mA, 12 Bit, max. impedance 500 Ω, not isolated
Serial interfaces	Interface 1: RS-232, fixed, not isolated Interface 2: RS-232, fixed, not isolated Interface 3: RS-485 2/4-wire, not isolated Max. baud rate: 38400
Data processing procedures	Siemens 3964R S5 (RK512) DDP8672 standard protocol DDP8785 poll protocol Modbus SB03
Secondary display procedure	DTA, DDP8861, DDP8850

Ethernet interface (on board)	10 / 100Mbit/s, galvanic isolation
USB interface (on board)	For PC keyboard, not isolated
Fieldbus protocols (optional)	Profibus DP, galvanic isolation Device Net, galvanic isolation
Other Options	Legal-for-trade memory module

EU-directives:	
Non-automatic weighing instrument	90/384/EEC
Measuring instruments	2004/22/EC
Electromagnetic compatibility	89/336/EEC
Low voltage directive	2006/95/EC
Standards:	
Non- automatic weighing instrument	EN45501, OIML R76
EMC standard: Generic standards; Immunity for industrial environments	EN61000-6-2: 2005-06
EMC standard: Generic standards; Emission standard for residential, commercial and light-industrial environments	EN61000-6-3: 2006-03
Automatic catchweigher	OIML R51
Automatic gravimetric filling instrument	OIML R61
Discontinuos totalizing automatic weighing instrument	OIML R107

9. SPARE PARTS

Name	*Type*	*Material No.*
Basic units		
WA-801, stainless steel indicator with a flexible membrane keyboard, 9 keys	VKG 20713	V0010913
WA-802, stainless steel indicator with a flexible membrane keyboard, 21 keys	VKG 20703	V0010919
WA-802r, top-hat rail device without a keyboard	VEG 20700	V0010925
WA-804, stainless steel indicator with a flexible membrane keyboard, 21 keys	VKG 20703	V0010937
WA-805, stainless steel indicator with a flexible membrane keyboard, 21 keys	VKG 20703	V0010943
WA-806, stainless steel indicator with a flexible membrane keyboard, 21 keys	VKG 20703	V0010949
WA-807, stainless steel indicator with a flexible membrane keyboard, 21 keys	VKG 20703	V0010955
WA-810, stainless steel indicator with a flexible membrane keyboard, 6 keys	VKG 20790	V0010968
Options		
PROFIBUS-DP Fieldbus module	VPB 020	V0010904
PROFIBUS-DP Fieldbus module	VPB 8020	V0011010
DeviceNet Fieldbus module	VCB 020	V0010905
Legal-for trade memory module	VMM 20490	V0010906
Dongle, calibrating data memory		V0010986

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