



MAC 300 Technical Datasheet

Multiparameter signal converter

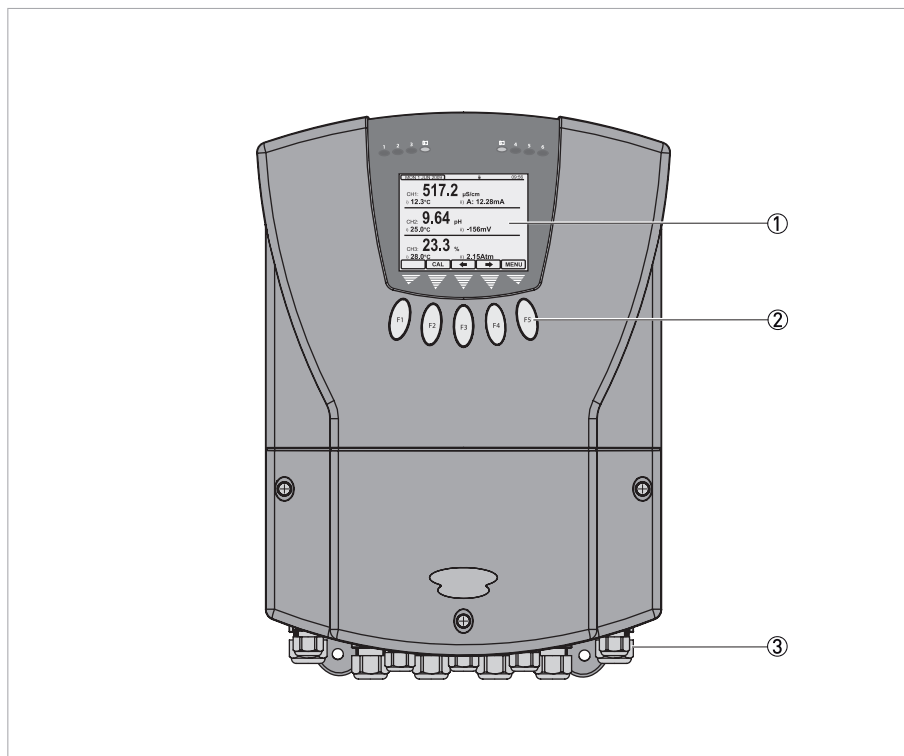
- Menu driven transmitter for up to three measurements
- Intuitive menu structure
- Live trending and data logging

The documentation is only complete when used in combination with the relevant documentation for the sensor.

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1.1 Multiparameter converter for liquid analytical measurements

The MAC 300 is a menu driven multiparameter signal converter. The signal converter is available in 2 versions as wall (300 W) or panel mount (300 R) version with same functionalities. It can host up to 3 input cards for different parameters such as pH, conductivity and total suspended solids (TSS). The instrument may be subsequently modified to changing requirements by installation of additional or different cards for up to 6 control and up to 6 0/4...20 mA current outputs. The menu structure is intuitive and self explaining. The benefit is quick commissioning, reduced training times and adaptability to your operating process.



- ① Display
- ② Operation keys
- ③ Cable glands

Highlights

- Multiparameter signal converter
- Innovative menu structure
- Up to 3 sensor input cards
- Up to 6 current outputs
- Up to 6 relay outputs
- Optional Modbus communication card
- Optional data logging and live trending software
- Calibration and error logbooks
- SD card slot to e.g. save parameter sets

Industries

- Water / Waste water
- Power industry
- Process industry
- Food and Beverages

1.2 Measuring principle

Depending on the measurement principle of the sensor different sensor input cards need to be installed. The compatibility to the relevant sensor has to be checked. The signal converter is used for classic non smart sensors.

2.1 Technical data table

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Measuring system

Measuring principle	The measuring principle depends on the used sensor(s), for further information refer to the sensor manual(s).
Application range	Continuous measurement of analytical parameters in various applications.
Measuring range	The measuring range depends on the used sensor(s), for further information refer to the sensor manual(s).

Design

Construction	A typical measuring system consists of: <ul style="list-style-type: none"> • MAC 300 multiparameter signal converter • 1 (or up to 3) sensors of the OPTISENS series • Sensor cables • Mounting assemblies
Input Expansion Slots	3 slots, user configurable with any combination of available input add-in cards.
Output Expansion Slot	1 slot, user configurable with an additional output option add-in card.
Sensors	For further information refer to the manual of the relevant sensor.
Alarm LED's	2 Yellow LED's located above the main display area for instrument's alarm status, lit = active.
Setpoint and control relays options	2 change over relays as standard, expandable up to a total of either 4 change over relays, or 4 change over relays + 2 normally open relays depending on the number of current outputs.
Setpoint and control relays specification	Fully configurable setpoints with volt free contacts for each relay. Rated at 5A @ 30V DC / 5A @ 250V AC.
Setpoint LED's	6 Red LED's located above main display area for setpoint status indication, lit = relay energised.
Setpoint modes	On/Off, Time Proportioning, Pulse Proportioning, Band and Latch. Delay timer adjustable from 00:00 to 59:59 mm:ss. Hysteresis 0 to 9.9%. Dose alarm timer, with supplementary initial charge function. Both adjustable from 00:00 to 59:59 mm:ss. Adjustable cycle time and proportional band in proportional modes.
Setpoint cleaning	Cleaning mode with adjustable duration (max 10m) and interval times (max 24h), auto offline function with recovery timer.
Setpoint Alarm	Unit or channel alarm mode, whereby the relay can be energised under certain set conditions.
Protection category acc. to IEC 529 / EN 60529:	IP66
Display and user interface	
Graphic display	3 3/4" QVGA back lit LCD module.
Operating elements	5 tactile feedback, micro-switched, silicone rubber.
Operating menu	Menu mode: variety of main and submenus that allow to customise the device according to the demands of the measuring point.

Operating and display languages	English, French, Italian or Spanish
Units	The measuring unit depends on the used sensor(s), for further information refer to the sensor manual(s).

Measuring accuracy

Reference conditions	Temperature: 20°C / 68°F
	Pressure: 1 bar / 14.5 psi
Total suspended solids	<2% of reading after linearisation
	Repeatability: $\pm 0.1\%$ of range
Dissolved oxygen	$\pm 3 \mu\text{A}$ (Galvanic Mode)
	$\pm 1.0 \text{ nA}$ (Polarographic Mode)
	Repeatability: $\pm 0.1\%$ of range
Auxiliary input	$\pm 0.1\%$ of reading.
	Repeatability: $\pm 0.1\%$ of range
Conductivity	$\pm 0.1\%$ of range
	Repeatability: $\pm 0.1\%$ of range
pH / Redox	$\pm 0.05 \text{ pH} / \pm 3 \text{ mV}$
	Repeatability: $\pm 0.1\%$ of range
Maximum measuring error	For further information refer to the manual of the relevant sensor.
Resolution	Temperature: 0.1°C / 0.1°F
	For further information refer to the manual of the relevant sensor.
Long-term stability	24 hours: tested within accuracy definition
Temperature drift	Tested within accuracy definition
Cable length variation	Tested within accuracy definition

Operating conditions

Temperature	
Ambient	-20...+50°C / +4...122°F for full specification.
	Note: the manufacturer strongly recommends to protect the signal converter from external heat sources such as direct sunlight as higher temperatures reduce the life cycle of all electronic components!
Storage	-40...+70°C / -40...+158°F

Installation conditions

Installation	Wall or rack mounting is possible, always assure a vertical mounting orientation!
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Materials

Signal converter housing	Polycarbonate (PC) / Acrylonitrile Butadiene Styrene (ABS) blend
Sensor	For housing materials, process connections, liners, grounding electrodes and gaskets, see the technical documentation for the sensor.

Electrical connections

General	Electrical connection is carried out in conformity with the VDE 0100 directive "Regulations for electrical power installations with line voltages up to 1000 V" or equivalent national regulations.
Modbus RS485 Interface (Optional)	Supports RTU and ASCII formats
	Node Address: 1 to 247
	Baud Rates (Bits Per Second) : 300, 600, 1200, 2400, 4800, 9600, 19200, 31250, 38400
	Parity Options: Even, Odd, None
SD Card Interface	Enables backing up and restoring of instrument configuration, log the sensor readings (optional extra) and on site upgrading of instrument software. SD, SDHC and SDXC-FAT32 cards supported.
Power supply	
Voltage	85...265 V AC/DC Power connections, 15W max.
	18...32 V AC/DC Power connections, 20W max.

Inputs and outputs

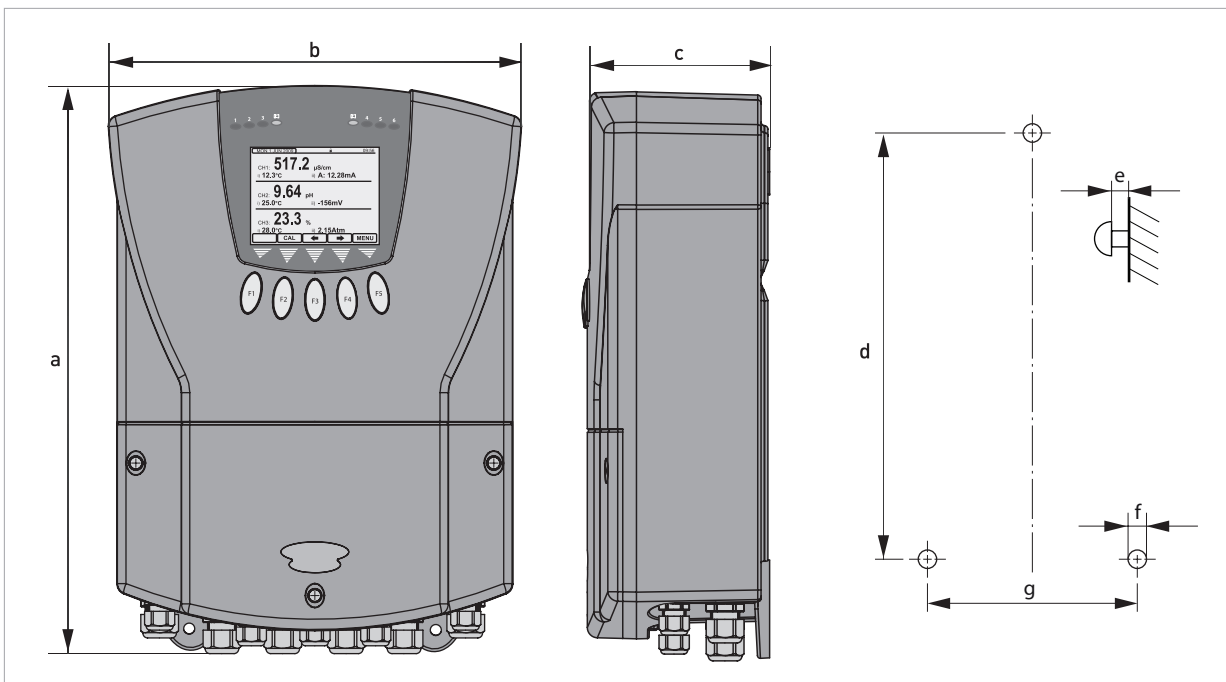
General	All in- and outputs are electrically isolated from each other and from all other circuits.
	All operating data and output values can be adjusted.
Description of used abbreviations	U_{ext} = external voltage R_L = load + resistance; U_o = terminal voltage I_{nom} = nominal current
Inputs	
Digital inputs	8 contact closures for remote activation of user defined operations. Can be configured to operate in either normally open or normally closed modes.
Outputs	
Current output options	1 as standard, expandable up to a total of 4 or 6 depending on the number of relays.
Current Output Specification	Each selectable 0-20mA or 4-20mA into 750 ohms max, fully isolated to 2kV. Expandable up to 5% of any operating range and offset anywhere in that range.
Current Output Adjustment	± 0.01 mA, 3 point 0-4-20 mA for remote monitor calibration.
Relay outputs	Three electro-mechanical relays that can work as alarm relays or limit switches
	Possible conditions: NO (normally open) or NC (normally closed)
	Contact ratings: <ul style="list-style-type: none"> • Relays for low voltages: $U \leq 30$ VDC, $I \leq 1$ A, resistive load (PELV / SELV) or $U \leq 50$ VAC, $I \leq 4$ A, resistive load (PELV / SELV) • Relays for high voltages: $U = 100...230$ VAC, $I \leq 4$ A, max. 1000 VA resistive load

Approvals and certifications

CE
This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
For full information of the EU directives and standards and the approved certifications, please refer to the EU declaration or the website of the manufacturer

2.2 Dimensions and weight

Wall mount



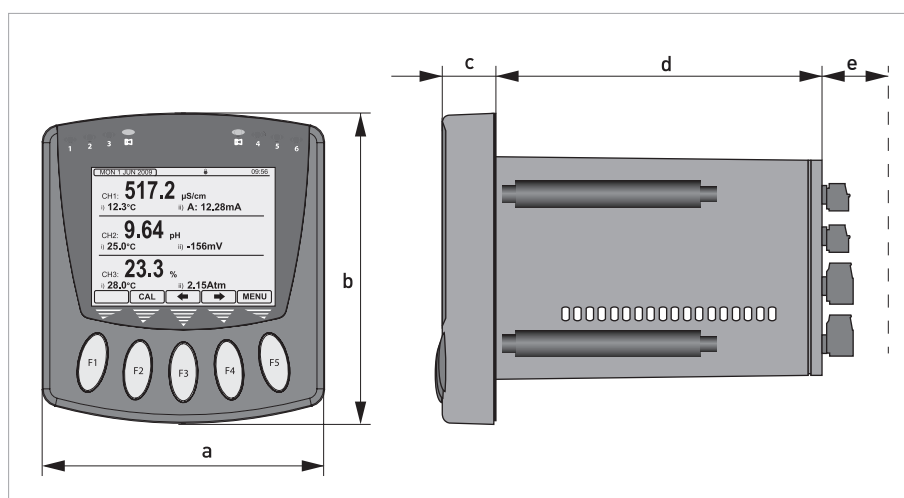
Dimensions and weights in mm and kg

Dimensions [mm]							Weight [kg]
a	b	c	d	e	f	g	
331	242	110	300	8	6 x 3	148	2.5

Dimensions and weights in inches and lb

Dimensions [inch]							Weight [lb]
a	b	c	d	e	f	g	
13.03	9.53	4.3	11.81	0.31	0.24 x 0.12	5.83	5.5

Rack mount



Dimensions and weights in mm and kg

Dimensions [mm]					Weight [kg]
a	b	c	d	e	
116	128	23	134	25	0.8

Dimensions and weights in inch and lb

Dimensions [inch]					Weight [lb]
a	b	c	d	e	
4.57	5.04	0.91	5.28	0.98	1.8

The panel cut-out for the instrument should be 92 mm x 92 mm / 3.62" x 3.62" (+1.0 / -0.0)

3.1 Intended use

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries.

If the device is not used according to the operating conditions (refer to chapter "Technical data"), the intended protection could be affected.

In combination with the different sensors of the OPTISENS series the MAC 300 measures analytical parameters in various applications.

3.2 Storage and transport

- Store and transport the device in a dry, dust-free location.
- Avoid continuous direct sunlight.
- Store and transport the device in its original packing.
- Storage temperature: -40...+70°C / -40...+158°F.

3.3 Wall mounting

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries.

Always note the following items to ensure a proper and safe installation:

- *Make sure that there is adequate space to the sides.*
- *The device must not be heated by radiated heat (e.g. exposure to the sun) to a electronics housing surface temperature above the maximum permissible ambient temperature. If it is necessary to prevent damage from heat sources, a heat protection (e.g. sun shade) has to be installed.*
- *Signal converters installed in control cabinets require adequate cooling, e.g. by fan or heat exchanger.*
- *Do not expose the signal converter to intense vibration.*
- *Use assembly materials and tools in compliance with the applicable occupational health and safety directives (assembly materials and tools are not part of the scope of delivery).*

Installation, assembly, start-up and maintenance may only be performed by appropriately trained personnel. The regional occupational health and safety directives must always be observed.

Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

3.4 Noise suppression

In common with other electronic circuitry, the instrument may be affected by high level, short duration noise spikes arising from electromagnetic interference (EMI) or radio frequency interference (RFI). To minimise the possibility of such problems occurring, the following recommendations should be followed when installing the unit in an environment where such interference could potentially occur.

The following noise generating sources can affect the instrument through capacitive or inductive coupling:

- Relay coils
- Solenoids
- AC power wires, particularly at or above 100V AC
- Current carrying cables
- Thyristor field exciters
- Radio frequency transmissions
- Contactors
- Motor starters
- Business and industrial machines
- Power tools
- High intensity discharge lights
- Silicon control rectifiers that are phase angle fired

The instrument is designed with a high degree of noise rejection built in to minimise the potential for interference from these sources, but it is recommended that you apply the following wiring practices as an added precaution. Cables transmitting low level signals should not be routed near contactors, motors, generators, radio transmitters, or wires carrying large currents.

If noise sources are so severe that the instrument's operation is impaired, or even halted, the following external modifications should be made, as appropriate:

- Fit arc suppressors across active relay or contactor contacts in the vicinity.
- Run signal cables inside steel tubing as much as is practical.
- Use the internal relays to switch external slave relays or contactors when switching heavy or reactive loads.
- Fit an in-line mains filter close to the power terminals of the instrument.

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Used abbreviations

Abbreviation	Description
C_p	Control input passive
I_a	Current output active
I_{max}	Maximum current
I_{nom}	Nominal current
R_L	Load resistance
R plus number (e.g. R1)	Relay contact
P	Power
U_{ext}	External voltage source
$U_{ext, max}$	Maximum voltage of the external voltage source
$U_{int, nom}$	Nominal internal voltage
U_{on}	Voltage for triggering the control input (on)
U_{off}	Voltage for triggering the control input (off)

4.3 Important device-specific notes on electrical connection

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries!

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

When installing and wiring the device, note the safety regulations of the current state of the art. Also note the following items to avoid fatal injuries, destruction or damage of the device or measuring errors:

- *De-energise the cables of the power supply before you start any installation works.*
- *Always install input and control cables divided from each other and from high voltage current cables.*
- *Assure that all cables of the inputs and current outputs are shielded. Connect the shieldings only to one side, e.g. to the device.*
- *When using relays, note that with inductive loads the interference must be suppressed.*
- *Assure that all electrical connection works are compliant with the VDE 0100 directive "Regulations for electrical power installations with line voltages up to 1000 V" or equivalent national regulations.*
- *Use suitable cable glands for the various electrical cables and suitable connecting cables for the field of application. The outer diameter of the connecting cables has to fit to the cable glands.*
- *The nominal voltage of the connecting cable has to fit to the operating voltage of the device.*

Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

4.4 Opening the converter cover / housing (wall mount)

Clean and grease all threads each time you open the housing. Use only resin-free and acid-free grease. Before closing the cover, ensure that the housing gasket is properly fitted, clean and undamaged.

All installation works on the electrical connections require to open the converter cover:

Step 1

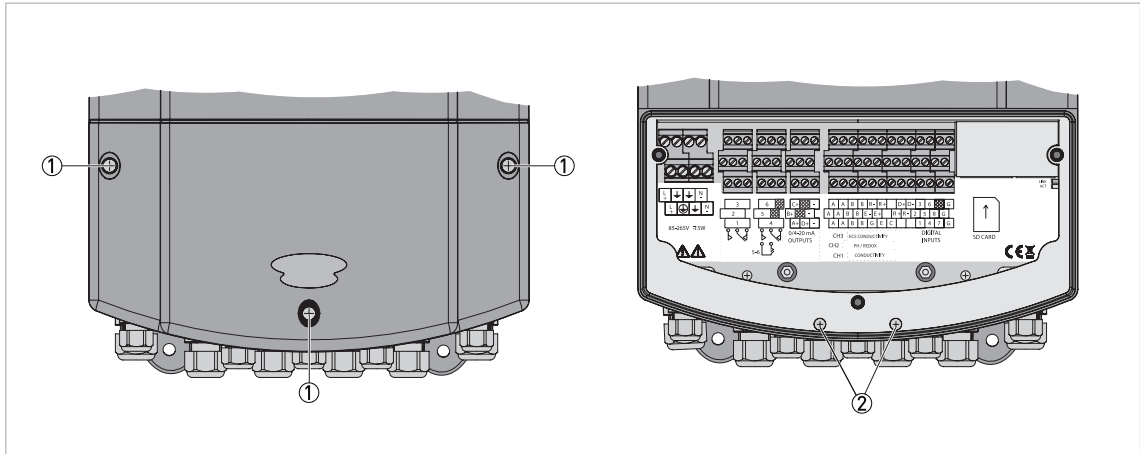


Figure 4-1: MAC 300 W front view

- ① Screw (crosstip)
- ② Screw (crosstip)

- Loose the 3 screws ① with a crosstip screwdriver.
- Lift the cover up.
- ➡ You have access to the terminal compartment now.

- Access to the mainboard
- Loose the 2 screws ② with a crosstip screwdriver.
- Continue with step 2

Step 2

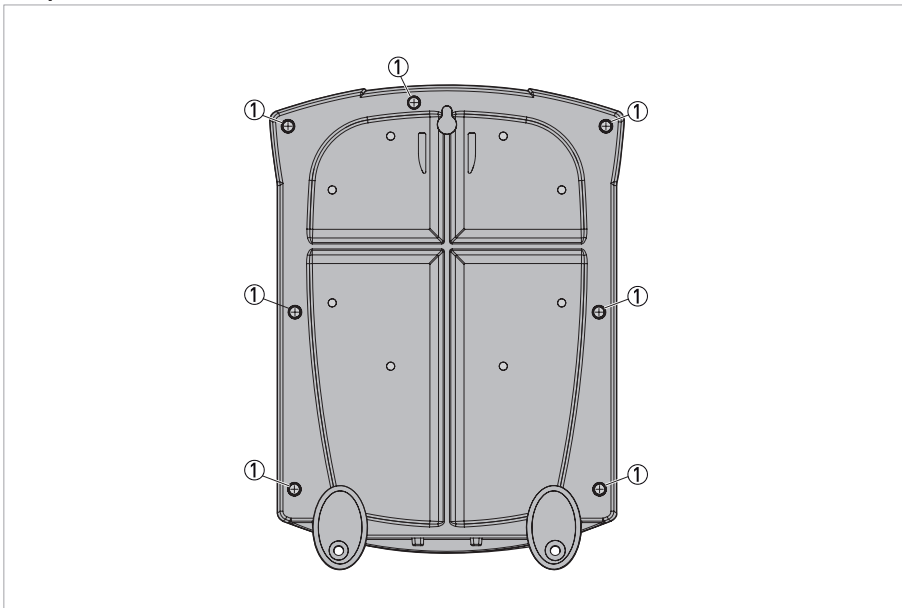


Figure 4-2: MAC 300 W rear view

① Screw (crosstip)

- Loose the 7 screws with a crosstip screwdriver.
- Lift the housing up.
- ➡ You have access to the mainboard now.

4.5 Opening the converter cover (rack mount)

Clean and grease all threads each time you open the housing. Use only resin-free and acid-free grease. Before closing the cover, ensure that the housing gasket is properly fitted, clean and undamaged.

- Loose the 4 screws with a crosstip screwdriver.
- Lift the housing up.
- ➡ You have access to the mainboard now.

4.6 Connecting the signal cables

The cable glands installed by the manufacturer are designed for a cable diameter of 8 to 13 mm. If you are using cables with a larger diameter, you must replace the manufacturer's cable glands with suitable ones.

For all information concerning the signal cables of the used sensor(s) and their connection refer to the relevant sensor handbook(s).

4.7 Basic connections

Having ensured that the main power is isolated from the instrument, remove the terminal cover by releasing the three front screws. (The terminal cover is the small cover at the bottom of the front panel). Once the cover has been removed the following terminal arrangement should be visible. N.B. the appearance of the label will vary depending upon which options are installed in the instrument.

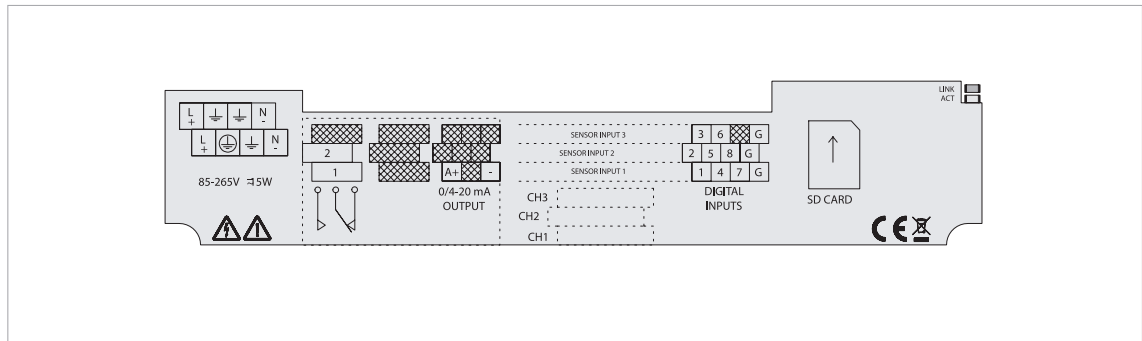


Figure 4-3: Overview basic connection

The cables should be fed through the cable glands. After each cable has been attached, pull most of the cable slack back through the cable gland to prevent any unwanted RF energy from being radiated inside the housing. Make sure not to strain the cable within the instrument. Tighten the cable gland onto the cable so that it grips sufficiently to seal and to prevent the cable from being pulled back through the gland.

4.8 Supply voltage connections

The converter can be powered from either an AC or DC supply voltage. The unit provides two terminals for each of the input connections ("Live" & "Neutral" for an AC input, or + & - for a DC Input), plus an "Earth" terminal. This allows the supply to be "daisy chained" to the relay contacts and/or other instruments. The instrument uses a universal power supply that accepts a wide range of voltage and frequency inputs. Refer to the label adjacent to the power supply terminals for the input voltage limits.

Wall mount (85-265V AC/DC)

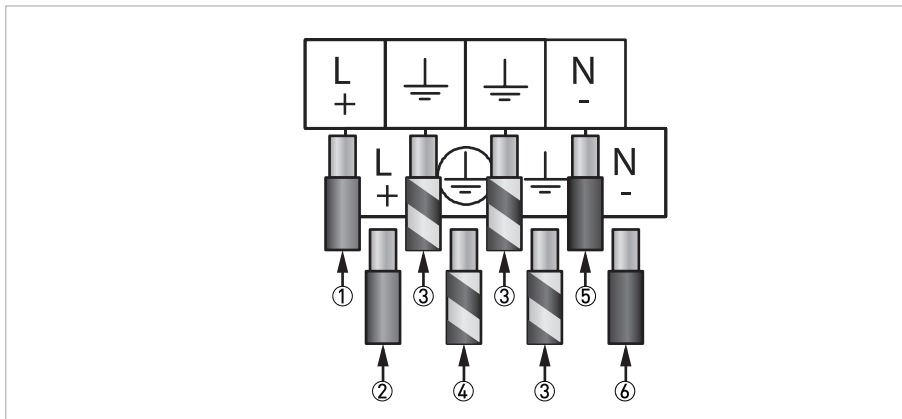


Figure 4-4: Power connector MAC 300 W

- ① Power supply "Live" out (for daisy chaining)
- ② Power supply "Live" in
- ③ Earth
- ④ Protective Earth (Must be connected)
- ⑤ Power supply "Neutral" out (for daisy chaining)
- ⑥ Power supply "Neutral" in

Wall mount (18-32V AC/DC)

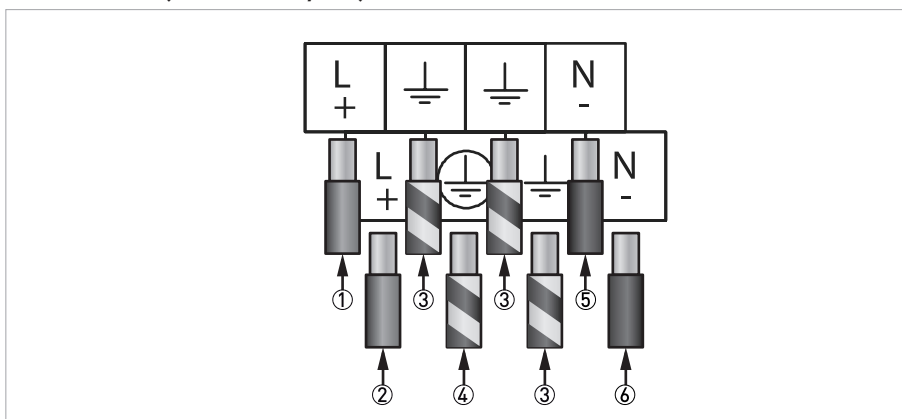


Figure 4-5: Power connector MAC 300 W

- ① Power supply "+" out (for daisy chaining)
- ② Power supply "+" in
- ③ Earth
- ④ Protective earth (Must be connected)
- ⑤ Power supply "-" out (for daisy chaining)
- ⑥ Power supply "-" in

Rack mount (85-265V AC/DC)

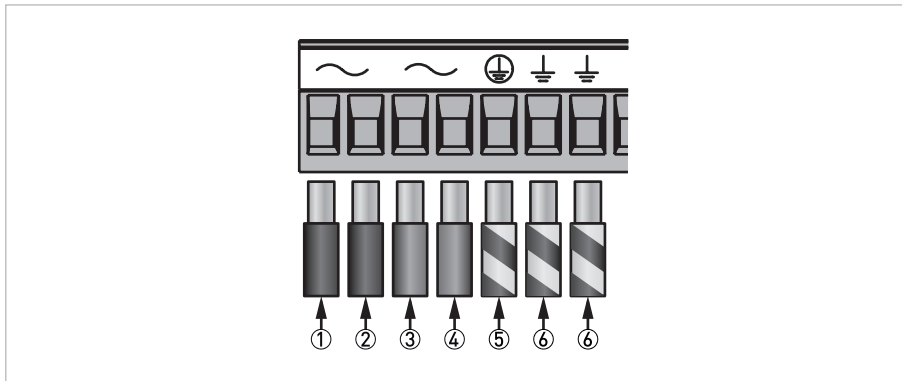


Figure 4-6: Main power connector MAC 300 R

- ① Power supply "Live" in
- ② Power supply "Live" out (for daisy chaining)
- ③ Power supply "Neutral" in
- ④ Power supply "Neutral" out (for daisy chaining)
- ⑤ Protective earth (must be connected)
- ⑥ Earth

Rack mount (18-32V AC/DC)

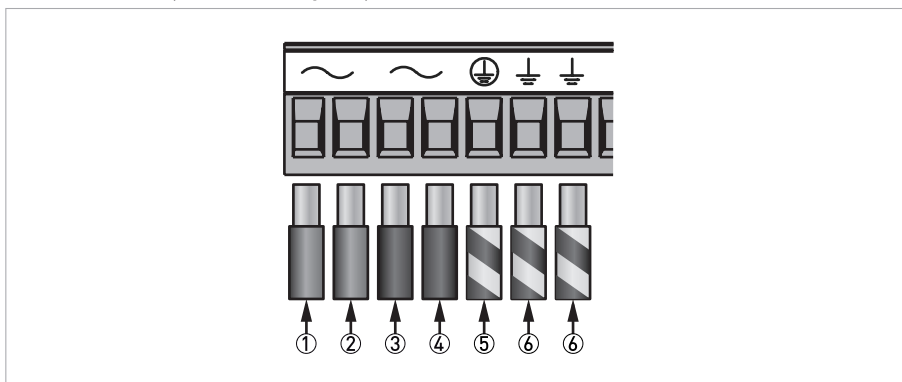


Figure 4-7: Main power connector MAC 300 R

- ① Power supply "+" in
- ② Power supply "+" out (for daisy chaining)
- ③ Power supply "-" in
- ④ Power supply "-" out (for daisy chaining)
- ⑤ Protective earth
- ⑥ Earth

To prevent destruction or damage, never operate the device outside of its permissible mechanical, thermal or chemical limits.

The power supply should be taken from an isolated spur and fused to a maximum of 3 Amps. If the relays require greater current, then a separate 5A fuse will be required. The incoming earth connection must be connected to the "Protective Earth" terminal.

4.9 Connecting the power supply

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries!

When connecting the power supply, always note the safety regulations of the current state of the art. Also note the following items to avoid fatal injuries, destruction or damage of the device or measuring errors:

- *De-energise the cables of the power supply before you start any installation works!*
- *Always keep the housing of the device well closed if you do not perform any installation works. The function of the housing is to protect the electronic equipment from dust and moisture.*
- *Assure that there is a fuse protection for the infeed power circuit ($I_{nom} \leq 16 A$) and a disconnecting device (switch, circuit breaker) to isolate the signal converter.*
- *Check the nameplate and assure that the power supply meets the voltage and frequency of the device. Universal 80-265 V AC or DC, 15 W max. LV Option 18-32 V AC or DC, 20 W max. A power supply outside these specifications may destroy the device!*
- *Assure that the protective earth conductor (PE) is longer than the L- and N-conductor.*

4.10 Analog current output connections

The converter can be supplied with up to 6 current outputs designated A to F, which can terminate into a load resistance not exceeding 750Ω . For best noise immunity use a screened twisted pair cable, with the screen connected to Earth at one end. Use a sufficiently large cable to avoid a high resistance in the overall current loop.

Rack mount

Analog output connector

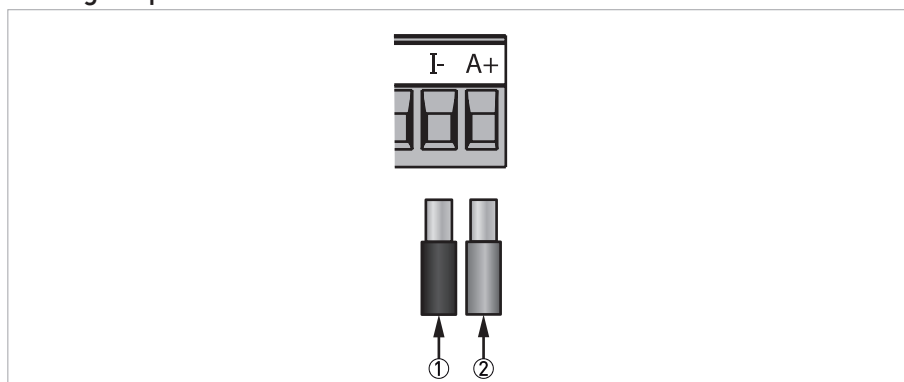


Figure 4-8: Current output A connection (MAC 300 R)

- ① Current output - (Common)
- ② Current output A+

Output option connector

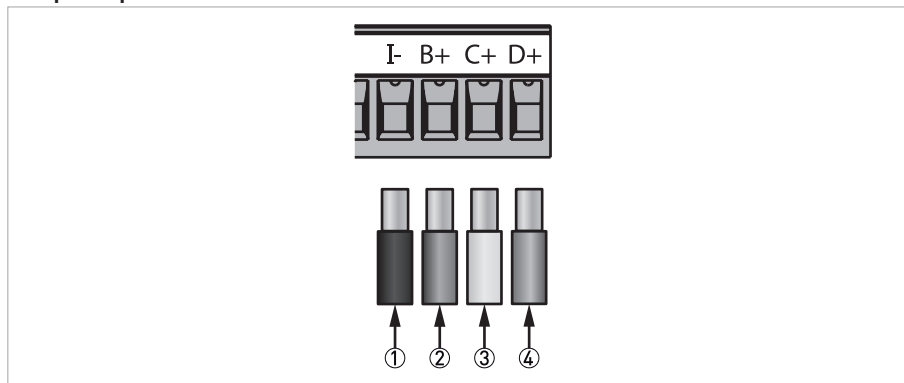


Figure 4-9: Current outputs B-D connection details (MAC 300 R)

- ① Current output - (Common)
- ② Current output B+
- ③ Current output C+
- ④ Current output D+

Output option connector

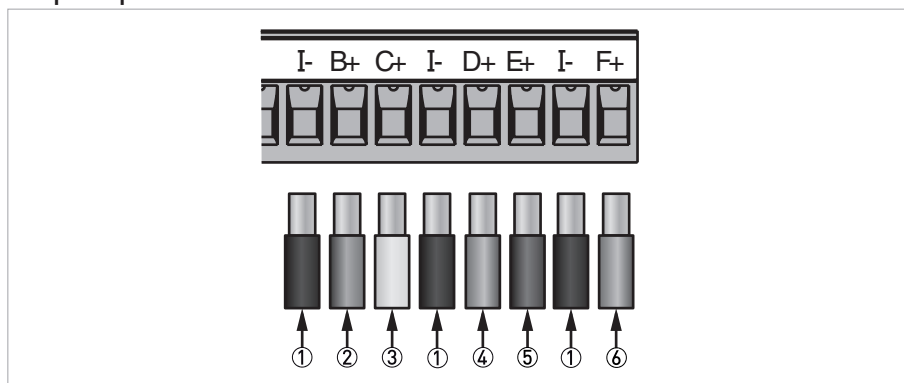


Figure 4-10: 5 current, 2 relays output expansion card
Current outputs B-F connection details (MAC 300 R)

- ① Current output - (Common)
- ② Current output B+
- ③ Current output C+
- ④ Current output D+
- ⑤ Current output E+
- ⑥ Current output F+

Wall mount

Current output connector

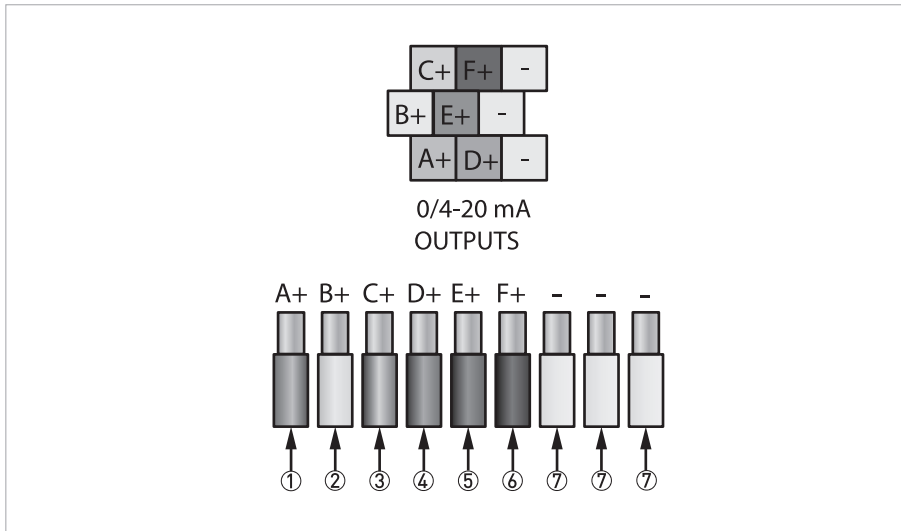


Figure 4-11: Current output connection detail (MAC 300 W)

- ① Current output A+
- ② Current output B+
- ③ Current output C+
- ④ Current output D+
- ⑤ Current output E+
- ⑥ Current output F+
- ⑦ Current output - (common)

Available current outputs varies depending upon instrument configuration

4.11 Relay connections

The converter can be supplied with up to 6 relays designated 1 to 6, 1 to 4 are change over relays while 5 to 6 are normally open relays. The relay contacts are connected to the terminals only and are electrically isolated from the instrument itself. They must be connected in series with a 5 Amp fuse. A contact arc suppressor may be required to prevent excessive electrical noise, depending upon the load. To switch more than 5 Amps will require a slave relay. For convenience, the power can be looped across from the supply connections.

Wall mount

Relays 1-3 connector

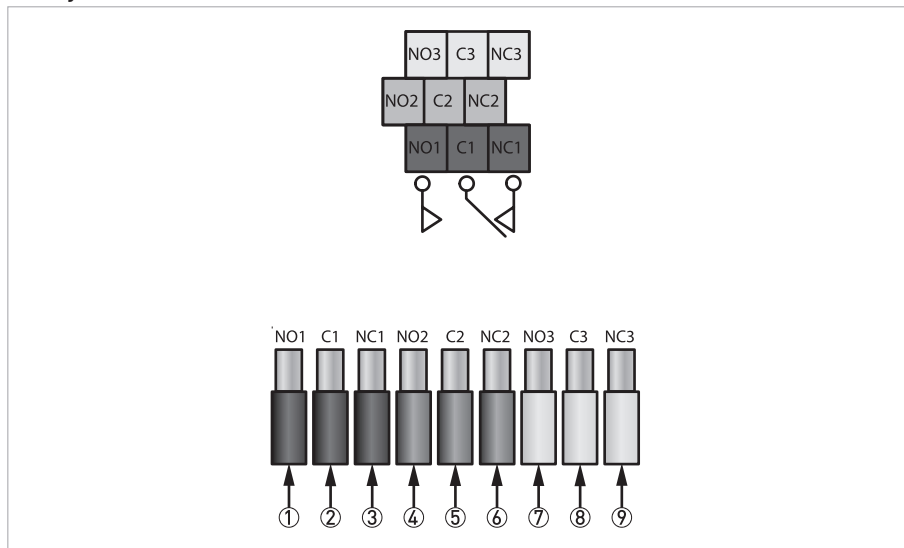


Figure 4-12: Connection details (MAC 300 W)

- ① Relay 1 normally open contact
- ② Relay 1 common contact
- ③ Relay 1 normally closed contact
- ④ Relay 2 normally open contact
- ⑤ Relay 2 common contact
- ⑥ Relay 2 normally closed contact
- ⑦ Relay 3 normally open contact
- ⑧ Relay 3 common contact
- ⑨ Relay 3 normally closed contact

Relays 4-6 connector

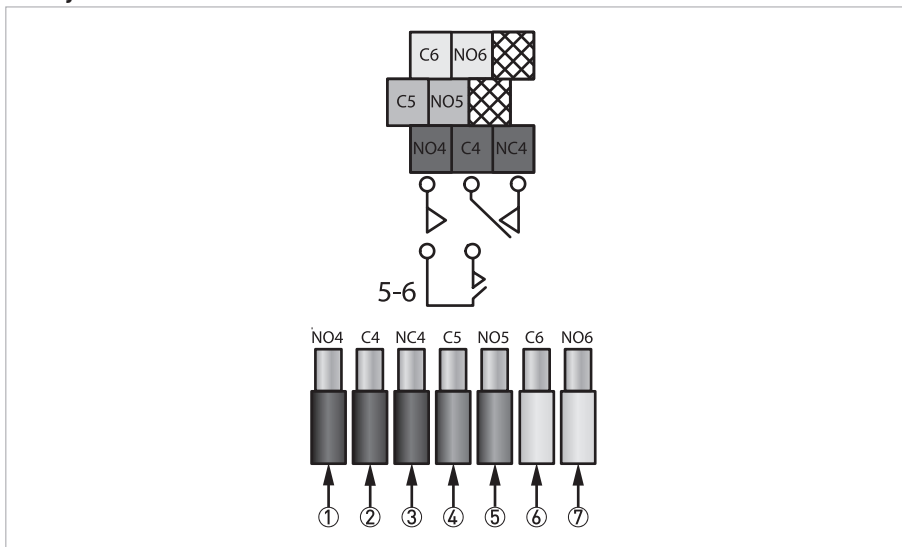


Figure 4-13: Connection details (MAC 300 W)

- ① Relay 4 normally open contact
- ② Relay 4 common contact
- ③ Relay 4 normally closed contact
- ④ Relay 5 normally open contact
- ⑤ Relay 5 common contact
- ⑥ Relay 5 normally closed contact
- ⑦ Relay 6 normally open contact

Rack mount

Main power and basic output connector

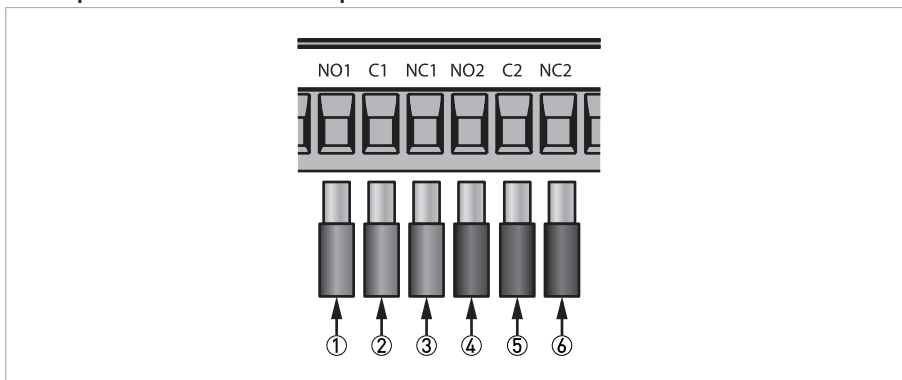


Figure 4-14: Relays 1-2 connection details (MAC 300 R)

- ① Relay 1 normally open contact
- ② Relay 1 common contact
- ③ Relay 1 normally closed contact
- ④ Relay 2 normally open contact
- ⑤ Relay 2 common contact
- ⑥ Relay 2 normally closed contact

Output option connector

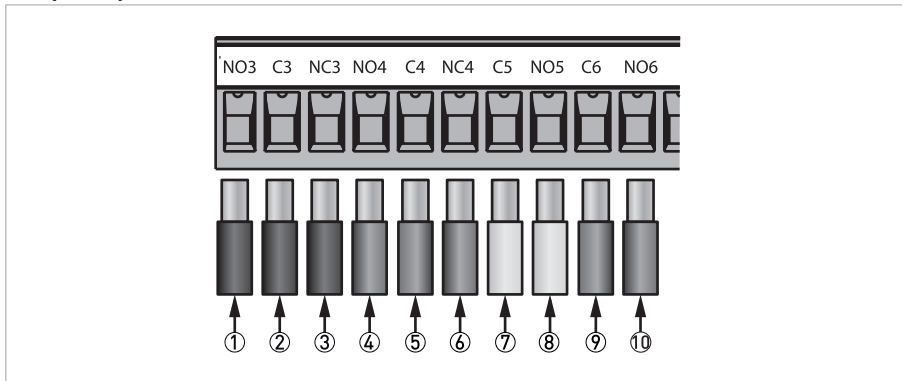


Figure 4-15: Relays 3-6 connection details (MAC 300 R)

- ① Relay 3 normally open contact
- ② Relay 3 common contact
- ③ Relay 3 normally closed contact
- ④ Relay 4 normally open contact
- ⑤ Relay 4 common contact
- ⑥ Relay 4 normally closed contact
- ⑦ Relay 5 common contact
- ⑧ Relay 5 normally open contact
- ⑨ Relay 6 common contact
- ⑩ Relay 6 normally open contact

Available current outputs varies depending upon instrument configuration

4.12 Digital inputs

The signal converter features 8 digital inputs, which can be used to initiate a user configurable instrument operation by use of a volt free link, switch or relay. The instrument can be configured to initiate the appropriate action when the contact either closes or opens.

Wall mount

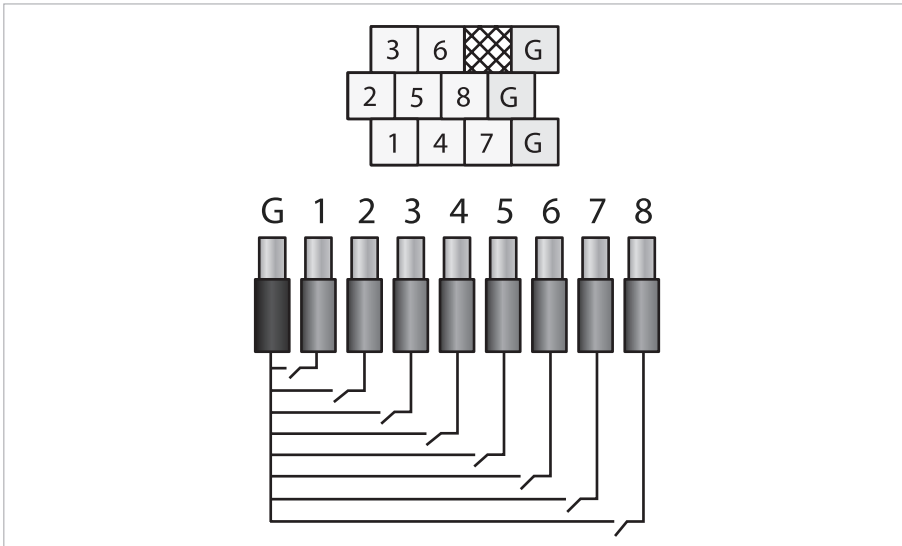


Figure 4-16: Connection details (MAC 300 W)

Rack mount

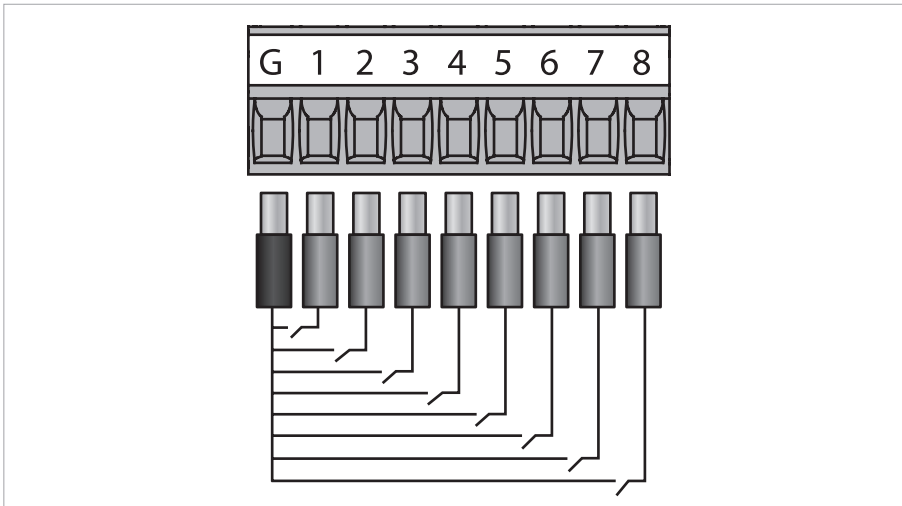


Figure 4-17: Connection details (MAC 300 R)

4.13 SD card interface

The converter features a SD card interface which is compatible with SD, SDHC and SDXC formatted cards (N.B. SDXC cards may need formatting by the converter before use). The card can be removed whilst the instrument is on but only when the disk icon is not shown at the top of the display.

To insert the card ensure that the corner notch is on the top right of the card, and then just push it all the way in to the socket. To remove the card push it in then release and the card should then come out of the socket.

4.14 Add-in cards installation

The signal converter is designed to be expandable by the use of add-in cards; these add-in cards can take the form of either a sensor input add-in card or an output option add-in card. The converter can be fitted with up to 3 sensor input cards and 1 output option card. The sensor input cards are designated Input Card 1, Input Card 2 and Input Card 3. On the instrument display these are designated Channel 1, Channel 2 and Channel 3.

Electrostatic precautions must be taken when handling the Add-in cards.

Wall mount

Input cards 1 & 2 are installed via the use of headers A and B. Insert the required input cards between the headers ensuring that the connectors are correctly aligned with the headers on the input cards.

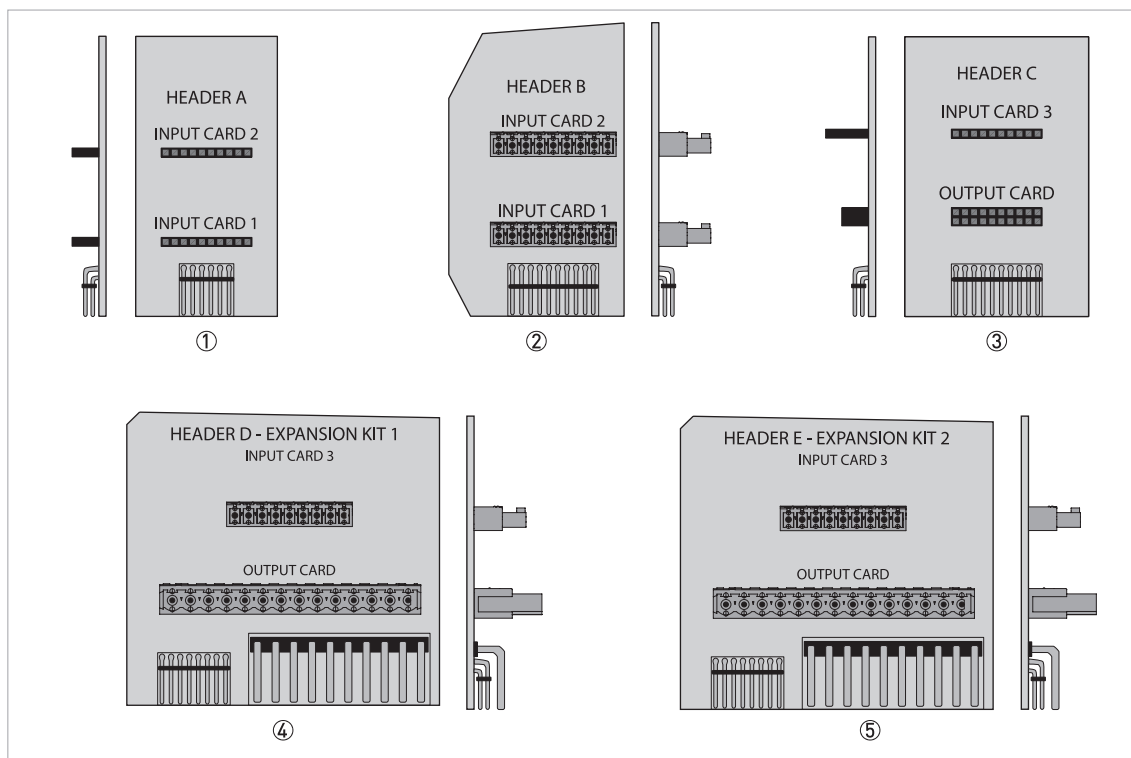


Figure 4-18: Overview header (MAC 300 W)

- ① Header A
- ② Header B
- ③ Header C
- ④ Header D
- ⑤ Header E

Insert the required input cards between the headers ensuring that the connectors are correctly aligned with the headers on the input cards.

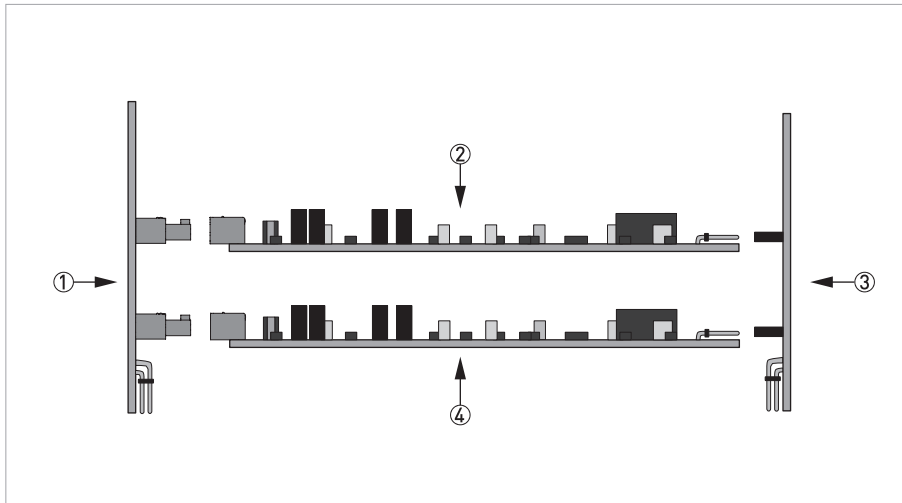


Figure 4-19: Header and input card mounting (MAC 300 W)

- ① Header B or header D/E
- ② Channel input card (only the channel 1 input card is not optional)
- ③ Header A or header C
- ④ Channel input card or output option card (Optional)

The headers with the cards attached must be inserted into the instrument's main board connectors. The header's name have to match with corresponding text on the board. Align the header board with the dotted outline on the main board. For an additional sensor attach the supplied connection labels to the terminal area label and inside the terminal.

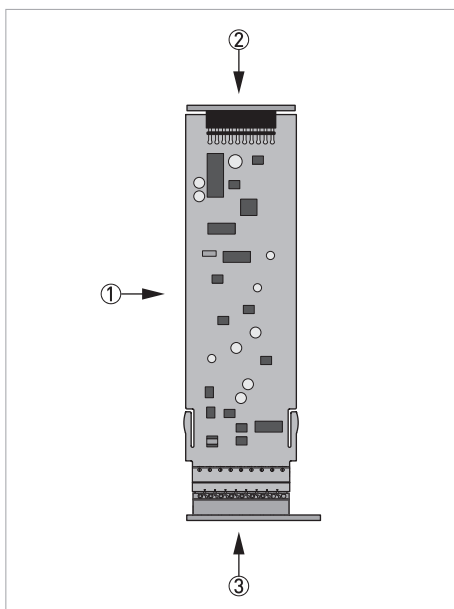


Figure 4-20: Input card (MAC 300 W and MAC 300 R)

- ① Channel input card
- ② Header A or header C
- ③ Header B or header D/E

Input card 3 and the output option card are installed via the use of header C and either header D or E depending on the configuration of the output option card.

Header's C, D and E are not supplied with the standard instrument and must be purchased separately if upgrading the unit after initial purchase.

Insert the required input card or output option card between the headers ensuring that the connectors are correctly aligned with the headers on the cards.

Rack mount

Cards must be inserted with the green connector towards the rear of the instrument case.

To install the new card into the instrument, first remove all existing connectors from the rear of the instrument. Then remove the four screws shown on the following diagram.

Remove the rear cover and the instrument note depending on the configuration of the instrument the add-in card slots may already be populated.

The add-in cards are inserted into the instrument with the edge of the card positioned down the middle of guide, and with the green connector towards the rear of the instrument case. Insert the card all the way in until the far connector is fully home.

Then depending upon the options installed affix the accompanying add-in description labels to the rear cover in the locations shown.

Put the rear cover back on the unit, screw the 4 screws and plug the connectors back in.

Depending on the configuration of the instrument the add-in card slots may already be populated.

4.15 Current output

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries.

The signal converter can be fitted with up to six current outputs designated A – F. Each individual current output can be assigned to any one of the sensor input channels. The current output menu contains all of the necessary setup functions to configure the current output sources. The instrument can display all of the enabled current outputs on one trend screen or alternatively if displaying only one sensor input channel, two trends can be shown on the front screen (see Configuration – Setup Front Screen, User Interface).

<p>You are on the main menu level. Press ↓ or ↑ until the submenu 4-20mA OUTPUTS is highlighted. Press ← to enter the chosen menu.</p>
<p>4-20mA OUTPUTS SETUP</p> <p>Dependig on the installed card select either the input channel you wish to edit Press ↓ or ↑ until the submenu you wish to edit is highlighted. For example</p> <ul style="list-style-type: none"> • 4-20mA OP A → CHANNEL 1 (SENSOR) • 4-20mA OP B → CHANNEL 1 (TEMP) • 4-20mA OP C → CHANNEL 2 (SENSOR) • 4-20mA OP D → CHANNEL 3 (SENSOR) • 4-20mA OP E → DISABLED <p>Press ← to enter the chosen menu.</p>
<p>4-20mA OUTPUTS A SETUP</p> <p>Press ↓ or ↑ until the submenu you wish to edit is highlighted. Enter the access code with the help of ↓ or ↑. The default security access code is 1000</p> <p>Press ↓ or ↑ to choose between CHANNEL: DISABLED / CHANNEL 1 (COND) / CHANNEL 2 (pH) / CHANNEL 3 (SS) The “Sensor Input Channel” the current output is to be associated with. The channels shown depend on the configuration of the instrument. To disable the current output select the disabled option. This will turn off the output, remove it’s reading from the front screen, the current output trend screen and the menu header. It will also clear any error messages associated with it. INPUT SOURCE: SENSOR / TEMPERATURE OUTPUT: 4-20mA / 0-20mA RANGE: 0 to 99.99µS/cm / 0 to 999.9µS/cm / 0 to 9.999mS/cm / 99.99mS/cm This is only available if the associated sensor input channel has a range option and is set to auto in the channel’s setup menu. The available options will depend on the cell constant of the sensor used, consult the sensor manual for more information. ZERO (4mA): 0100 mg/l Enter the desired sensor value to be represented by 0mA or 4mA (depends on current output scaling). An inverse relationship can be achieved by setting the Zero greater than the Span. If the sensor reading falls outside this and the span value an error / alarm will be activated. SPAN (20mA): 1000 mg/l Enter the desired sensor value to be represented by 20mA. An inverse relationship can be achieved by setting the Span less than the Zero. If the sensor reading falls outside this and the zero value an error / alarm will be activated. ON ERROR: NO ACTION / DRIVE TO 0mA / DRIVE TO 4mA / DRIVE TO 22mA / HOLD LEVEL The current outputs can be programmed to output 0mA, 22mA or Hold their value when an error is detected on the input source (i.e. Sensor Fault, Temperature Fault), to provide remote warning of error conditions or to ensure fail safe operation. Press ← to enter the chosen menu.</p>
<p>Press EXIT several times to return to the measuring mode.</p>

4.15.1 Current output calibration

The user is provided with an opportunity to adjust the current output to calibrate any equipment that may be being used to monitor the current output signal.

<ul style="list-style-type: none"> You are on the main menu level. Press ↓ or ↑ until the submenu CALIBRATION is highlighted. Press ← to enter the chosen menu.
<p>CALIBRATION</p> <p>Press ↓ or ↑ until the submenu 4-20mA OUTPUTS is highlighted. Press ← to enter the chosen menu.</p>
<p>CALIBRATE 4-20mA OUTPUTS</p> <ul style="list-style-type: none"> Press ↓ or ↑ until the submenu you wish to edit is highlighted. <p>Enter the access code with the help of ↓ or ↑. The default security access code is 1000</p> <ul style="list-style-type: none"> Press ↓ or ↑ to choose between 4-20mA OUTPUT A → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS 4-20mA OUTPUT B → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS 4-20mA OUTPUT C → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS 4-20mA OUTPUT D → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS 4-20mA OUTPUT E → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS 4-20mA OUTPUT F → SET OUTPUT TO DMM TO 0mA, 4mA and 20mA USING ↑ AND ↓ ARROWS Press EXIT several times to return to the measuring mode.

4.15.2 Resetting the current output user calibration

If required the user can reset the current output user calibration back to factory settings.

<ul style="list-style-type: none"> You are on the main menu level. Press ↓ or ↑ until the submenu CALIBRATION is highlighted. Press ← to enter the chosen menu.
<p>CALIBRATION</p> <p>Press ↓ or ↑ until the submenu RESET USER CALIBRATION is highlighted. Press ← to enter the chosen menu.</p>
<p>RESET USER CALIBRATION</p> <ul style="list-style-type: none"> Press ↓ or ↑ until the submenu RESET 4-20mA OUTPUTS is highlighted. <p>Enter the access code with the help of ↓ or ↑. The default security access code is 1000</p> <ul style="list-style-type: none"> Press ↓ or ↑ to choose between 4-20mA OUTPUT A → RESET 4-20mA OUTPUT B → RESET 4-20mA OUTPUT C → RESET 4-20mA OUTPUT D → RESET 4-20mA OUTPUT E → RESET 4-20mA OUTPUT F → RESET Press EXIT several times to return to the measuring mode.

4.16 Digital inputs

Never install or operate the device in potentially explosive areas, it might cause an explosion that can result in fatal injuries.

For further information refer to the connection diagrams and the technical data table.

The signal converter is fitted with eight digital inputs designated 1 – 8. Each individual digital input can be assigned to any one of the sensor input channels or to the instrument as a whole. The digital input menu contains all of the necessary setup functions to configure the digital input sources. These inputs are intended to be switched using a volt free link, switch or relay. The user can select whether closing or opening the contact initiates the configured action.

- You are on the main menu level.
- Press ↓ or ↑ until the submenu **DIGITAL INPUTS** is highlighted.
- Press ← to enter the chosen menu.

DIGITAL INPUTS SETUP	
<p>Dependig on the installed card select either the input channel you wish to edit Press ↓ or ↑ until the submenu you wish to edit is highlighted. For example DIG IP 1 → CH 1 (OFF-LINE) DIG IP 2 → CH 1 (RANGE) DIG IP 3 → CH 3 (SWITCH SETUP) DIG IP 4 → CH 2 (CLEAN) DIG IP 5 → CH 2 UNIT DIG IP 6 → CH 2 DISABLED The status of the Digital Input is also shown to the left of each item. Filled circle = digital input closed circuit. Empty cirlce = digital input open circuit Press ← to enter the chosen menu.</p>	
Enter the access code with the help of ↓ or ↑. The default security access code is 1000	
DIGITAL INPUT 1 SETUP	
Press ↓ or ↑ until the submenu you wish to edit is highlighted.	
<p>CHANNEL: DISABLED / CHANEL 1 (SS) / CHANNEL 2 (pH) / CHANNEL 3 (COND) The "Sensor Input Channel" the digital input is to be associated with. The channels shown depend on the configuration of the instrument. Alternatively if Whole Unit is selected the action will affect all of the input channels. To disable the digital input select the disabled option.</p>	
<p>FUNCTION: OFF-LINE / SWITCH SETUP / INTERLOCK / FLOW SWITCH INPUT / TANK LEVEL SWITCH / CIP / CLEAN / RANGE CHANGING / CALIBRATION (within the sub menu shown functions only show if applicable for chosen measurement/sensor card)</p>	
OFF-LINE	These function when active will take the associated sensor input channel "offline". This causes any setpoints associated with the channel to deenergise. They are also accompanied by a message on the front screen informing the user which action is currently active. Note – When a digital input is assigned to one of these functions the user can no longer take the associated channel offline using the menu item in the channel setup menu or the channel calibration menu. As indicated by the "Cannot Edit, Digital Input Has Control" message. In addition to de-energising any associated setpoints the user can also define the operation the current outputs associated with the sensor input channel.
SWITCH SETUP	The digital input is used to load in an alternative sensor input channel configuration (Sensor Setup, Setpoint Setup and Current Output Setup) that have been stored in one of the two internal channel stores. Whilst the digital input is active no parameters assigned to the sensor input channel can be edited. The original configuration is restored upon the digital input going inactive. For information regarding saving the setup, see the Save and Restore section of the user interface guide. NOTE – Only one store at a time can be loaded per channel.

INTERLOCK	These function when active will take the associated sensor input channel "offline". This causes any setpoints associated with the channel to deenergise. They are also accompanied by a message on the front screen informing the user which action is currently active. Note – When a digital input is assigned to one of these functions the user can no longer take the associated channel offline using the menu item in the channel setup menu or the channel calibration menu. As indicated by the "Cannot Edit, Digital Input Has Control" message. In addition to de-energising any associated setpoints the user can also define the operation the current outputs associated with the sensor input channel.
FLOW SWITCH INPUT	These function when active will take the associated sensor input channel "offline". This causes any setpoints associated with the channel to deenergise. They are also accompanied by a message on the front screen informing the user which action is currently active. Note – When a digital input is assigned to one of these functions the user can no longer take the associated channel offline using the menu item in the channel setup menu or the channel calibration menu. As indicated by the "Cannot Edit, Digital Input Has Control" message. In addition to de-energising any associated setpoints the user can also define the operation the current outputs associated with the sensor input channel.
TANK LEVEL SWITCH	These function when active will take the associated sensor input channel "offline". This causes any setpoints associated with the channel to deenergise. They are also accompanied by a message on the front screen informing the user which action is currently active. Note – When a digital input is assigned to one of these functions the user can no longer take the associated channel offline using the menu item in the channel setup menu or the channel calibration menu. As indicated by the "Cannot Edit, Digital Input Has Control" message. In addition to de-energising any associated setpoints the user can also define the operation the current outputs associated with the sensor input channel.
CIP	The CIP input indicates to the associated sensor channel that a CIP event is in progress so that the sensor can be disabled, to prevent overstressing the probe. When active a "CIP ACTIVE" message appears next to the associated channel and the probe signal will go to 0000. As this will affect the setpoints and current outputs associated with this channel the user is recommended to assign an additional digital input to this channel set it to offline and energise the digital input in tandem with the CIP input. Note. CIP is only available on Suspended Solids and Turbidity input channels.
CLEAN	SETPOINT SETPOINT 1 If the selected Input Sensor Channel has a setpoint configured for a cleaning operation, an external cleaning cycle can be initiated using this function.
RANGE CHANGING	RANGE 0 to 99.99µS/cm / 0 to 999.9µS/cm / 0 to 9.999mS/cm / 99.99mS/cm The digital input is used to change the displayed range of the selected sensor input channel. This also affects the operating range of both the setpoints and current outputs associated with the sensor input channel. When Auto is selected the setpoints and current outputs will revert to the internally set ranges. The available options will depend on the cell constant of the sensor used, consult the input cards manual for more information. Note – This is only available if the associated Sensor Input Channel has a range option.
CALIBRATION	Initialise a dissolved oxygen span calibration.
POLARITY: NORMALLY OPEN / NORMALLY CLOSED Configure whether the digital input activates on the closing of circuit (normally open) or the opening of the circuit (normally closed).	
4-20mA OP LEVEL: NO ACTION / DRIVE TO 0mA / DRIVE TO 4mA / DRIVE TO 22mA / HOLD LEVEL	
Press ← to enter the chosen menu.	
Press EXIT several times to return to the measuring mode.	

4.17 Simulate channels

The facility exists within the singal converter to simulate the input sensor levels to test the setpoint and current output operation. This function allows the user to cycle up and down through the sensor range whilst displaying the current output level, and with the relays responding accordingly.

- You are on the main menu level.
- Press ↓ or ↑ until the submenu **CHANNELS** is highlighted.
- Press ← to enter the chosen menu.

CHANNELS SETUP

Press ↓ or ↑ until the submenu **SIMULATE CHANNELS** is highlighted.
Press ← to enter the chosen menu.

SIMULATE CHANNELS

Select the sensor or temperature you wish to simulate and observe the associated setpoints operate and current outputs move. Only input sensors or temperatures with setpoints or current outputs associated with them will appear. Note – This menu will not “time out” back to the front screen.

Press ← to enter the chosen menu.

- Press **EXIT** several times to return to the measuring mode.

4.18 Setpoints

The signal converter can be fitted with up to six setpoint relays designated 1 – 6. Setpoints 1 – 4 are “Change Over” relays while 5 – 6 are “Normally Open” relays. Each individual setpoint can be assigned to any one of the Sensor Input Channels. The Setpoint/Relays menu contains all of the necessary setup functions to configure the setpoint sources. The instrument indicates the status of the enabled setpoints by means of 6 LED indicators located above the main instrument display. A lit LED indicates that the setpoint / Relay is active. If the LED is blinking it indicates a dose alarm has occurred on that setpoint.

<p>You are on the main menu level. Press ↓ or ↑ until the submenu SETPOINT/RELAYS is highlighted. Press ← to enter the chosen menu.</p>
<p>SETPOINT / RELAYS SETUP</p> <p>Dependig on the installed card select either the input channel you wish to edit Press ↓ or ↑ until the submenu you wish to edit is highlighted. For example</p> <p>SETPOINT 1 → CHANNEL 1 (SENSOR) SETPOINT 2 → CHANNEL 1 (TEMP) SETPOINT 3 → CHANNEL 2 (SENSOR) SETPOINT 4 → CHANNEL 3 (SENSOR) SETPOINT 5 → CHANNEL 2 (CLEANING) SETPOINT 6 → UNIT ALARM</p> <p>Press ← to enter the chosen menu.</p>
<p>SETPOINT 1 SETUP</p> <p>Dependig on the installed card select either the input channel you wish to edit. Enter the access code with the help of ↓ or ↑. The default security access code is 1000</p> <p>CHANNEL: Select: DISABLED / CHANNEL 1 (COND) / CHANNEL 2 pH / CHANNEL 3 (SS) / UNIT ALARM</p> <p>The “Sensor Input Channel” the setpoint is to be associated with. The channels shown depend on the configuration of the instrument. For more information regarding the Unit Alarm option see the setpoint alarm mode section. To disable the setpoint select the disabled option. This will turn off the setpoint and clear any error messages associated with it</p> <p>INPUT SOURCE: Select SENSOR / TEMPERATURE / ALARM</p> <p>The input source for the selected setpoint. Available options vary depending on whether the appropriate source is enabled in the channel’s setup menu. Alarm option – see the setpoint alarm mode section. Cleaning option – see the setpoint cleaning mode section (not available on all input card types.)</p> <p>RANGE: Select 0 to 99.99µS/cm / 0 to 999.9µS/cm / 0 to 9.999mS/cm / 99.99mS/cm</p> <p>The setpoint’s operating range. This is only available if the associated Sensor Input Channel has a range option and is set to Auto in the channel’s setup menu. The available options will depend on the cell constant of the sensor used, consult the input card’s manual for more information</p>

TRIGGER: HIGH / LOW / BAND / LATCH HIGH / LATCH LOW / USP (Cond only, see conductivity manual for more information)	
HIGH	The setpoint will activate when the associated sensor input channel's input becomes greater than the setpoint level
LOW	The setpoint will activate when the associated sensor input channel's input becomes less than the setpoint level.
BAND	The setpoint will activate when the associated sensor input channel's input is either greater than the setpoint high level or less than the setpoint low level
LATCH HIGH	The setpoint will activate when the associated sensor input channel's input is greater than the setpoint high level and will remain active until the input falls below the setpoint low level. It will then remain inactive until the input level rises above the setpoint
LATCH LOW:	The setpoint will activate when the associated sensor input channel's input is less than the setpoint low level and will remain active until the input rises above the setpoint high level. It will then remain inactive until the input level falls below the setpoint low level.
HIGH VALUE: Enter the high value setpoint for the desired sensor	
LOW VALUE: Enter the low value setpoint for the desired sensor	
MODE: Select ON/OFF / PULSE PROB / TIME PROB	
The setpoints can operate in one of three modes. ON/OFF The setpoint energises when the setpoint is activated and de-energises when the setpoint is de-activated.	
ON / OFF	The setpoint energises when the setpoint is activated and de-energises when the setpoint is de-activated.
PULSE PROB	See setpoint proportional mode section.
TIME PROB	See setpoint proportional mode section.
DELAY: Enter the desired delay	
In order to prevent short duration changes at the input affecting the setpoint operation a delay can be set before the setpoint is energised. If the input is still the same after the delay, then the setpoint will be energised. Note- Only available when Trigger is set to High or Low and Mode is On/Off	
HYSTERESIS: Enter the desired Hysteresis	
A facility to apply hysteresis to the setpoint level allows the user to avoid setpoint "Chatter" when the sensor input level approaches the setpoint level. "Chatter" is caused when the sensor input is sufficiently close to the set point value and noise on the signal repeatedly crosses the set point level, thus causing the relay to switch on and off rapidly. The hysteresis level should therefore be set to be greater than the input noise level. The Hysteresis value is a percentage of the setpoint value applied both + and - to the setpoint. For example, if the setpoint was 10.00 and the Hysteresis was 1% then the hysteresis band would operate from 9.90 to 10.10.	
Hysteresis operates as follows: Trigger High – The setpoint is inactive until the reading is greater than the Setpoint High + (Setpoint High X Hysteresis %). It remains active until it goes below Setpoint High – (Setpoint High X Hysteresis %). Trigger Low – The setpoint is inactive until the reading is less than the Setpoint Low – (Setpoint Low X Hysteresis %). It remains active until it goes above Setpoint Low + (Setpoint Low X Hysteresis %). Trigger Band – The setpoint uses both high and low. Note. Hysteresis is only available when setpoint trigger is set to High, Low or Band.	

<p>DOSE ALARM: Select YES / NO The dose alarm timer can be used to prevent overdosing under many different fault conditions, such as sensor failure or application problems. Dose Alarm Active When the dose alarm activates the following happens: The setpoint will de-energise. The associated setpoint led will flash. The Dose Alarm error message will appear next to the associated input channel on the front screen. ACK will appear as a function to acknowledge the setpoint on the front screen. An error will be set for that input channel. To cancel the dose alarm and reactivate the setpoint, select the required setpoint. Note – If, once reset, the setpoint again remains energised for the length of the dose alarm timer then the dose alarm will once again activate. If this problem persists then a dosing problem will need to be investigated.</p>
<p>ALARM TIME: Enter the desired Alarm Time</p> <p>Sets the time which if the setpoint is active for longer than causes the dose alarm to activate. During pulse or time proportional mode the cumulative “on” time that the setpoint is active will be measured</p>
<p>INITIAL CHARGE: Select YES / NO</p> <p>This allows the user to have a one time over-ride of the Dose Alarm to use for example when filling a tank for the first time. The user enters a charge time and then initiates the charge time. The unit will then disable the dose alarm until either the relay becomes inactive because the setpoint has been reached or the charge timer reaches zero in which event the unit will automatically display a Dose Alarm.:</p>
<p>CHARGE TIME: Enter the initial CHARGE TIME</p>
<p>INITIAL CHARGE ACCESS: Select YES / NO</p> <p>Enabling this allows the user to initialise the initial charge by means of a menu on the front screen. Front Screen Initial Charge Enter the Initial Charge Menu by means of the INIT button. Initialise Initial Charge Select which setpoint to initialise the initial charge. Note – Once started the Initial charge timer will appear next to the associated input channel on the front screen.</p>
<p>INITIAL CHARGE: Select YES / NO</p> <p>The user can also start the initial charge via this option in the setpoint menu. Note – Once started the Initial charge timer will appear next to the associated input channel on the front screen.</p>
<p>CYCLE TIME: Sets the cycle time (sum of both On and Off periods). Note – Time Proportional mode only.</p>
<p>PROPORTIONAL BAND: Enter the size of the proportional band in measurement units.</p>
<p>Press EXIT several times to return to the measuring mode.</p>

4.18.1 Setpoint Proportional Mode

In addition to On/Off mode the signal converter also provides two forms of pseudo proportional control, which can be used to control the levels to a defined value when used in conjunction with a pump or valve. When the reading deviates from the programmed set point level the relay pulses at a rate proportional to that deviation. Note – Only available when Setpoint Trigger is set to either High or Low.

Pulse Proportional Mode

The Pulse Proportional mode is intended to drive solenoid type dosing pumps which have the facility to accept an external pulse input. The setpoint relay operates by producing a pulse of 0.2 seconds in duration and with a maximum period of one pulse per 30 seconds. The pulse rate increases as the measurement moves further from the set point, until it reaches the minimum period of one pulse per 0.4 seconds at the limit of the proportional band.

For example if the user sets a proportional band of 1.00, the setpoint trigger to LOW, and a setpoint value of 10.00. When the reading falls just below 10.00 the setpoint will begin to pulse at its longest period of once per 30 seconds. As the reading falls further from the setpoint the period will decrease until it reaches its minimum of one pulse every 0.4 seconds at the limit of the proportional band. (See Setpoint Pulse Rate – Pulse Proportional Mode section on the diagram below.)

Time Proportional Mode

Time Proportional Mode allows a user defined cycle time to control any on/off device such as a solenoid valve or dosing pump over a user set proportional band.

For example if the user sets a proportional band of 1.00, the setpoint trigger to LOW, and a setpoint value of 10.00. When the reading falls below 9.00 the setpoint would be energised 100% of the cycle time. As the input rises and approaches the set point the setpoint starts to cycle on and off with the on time reducing and the off time increasing, respectively until it reached the setpoint and would be off for 100% of the cycle time. The cycle time is adjustable and is the sum of the on and off times. (See Setpoint Cycle Time – Time Proportional Mode section on the diagram below.)

4.18.2 Setpoint alarm mode

By selecting alarm in the setpoints input source the setpoint can be configured as an alarm output triggered by one of a number of events.

- Sensor error - When a sensor related error is detected on the associated sensor input channel.
- Dose alarm - When any of the dose alarms is active on a setpoint associated with this setpoints sensor input channel.
- Calibration - When a calibration is in progress on the associated sensor input channel.
- Off-Line - When the associated sensor input channel has been taken "Off-Line."
- Any error - When any error is detected on the associated sensor input channel.
- Cleaning - When a cleaning operation is in progress on a setpoint associated with this setpoints sensor input channel.
- Calibration due - When if enabled the calibration due timer has expired on the associated sensor input channel.
- Gain error - When a gain error is present on the associated sensor input channel. Only available when set to a suspended solids input channel.
- Power failure - Holds the relay in a permanently energised state until the unit is powered down. Only available when using unit alarm.

By selecting Unit Alarm in the setpoint channel option each alarm option will activate if they occur on any of the instruments three sensor input channels.

4.18.3 Setpoint cleaning mode

The setpoints can be configured to operate a cleaning system on a timed cycle (e.g. jet pressure of pump or a solenoid for air pressure clean, depending on customer requirements). Its purpose is to prevent accumulation of particulate matter on the active surfaces of the sensor. Note that cleaning is not available on all sensor input types.

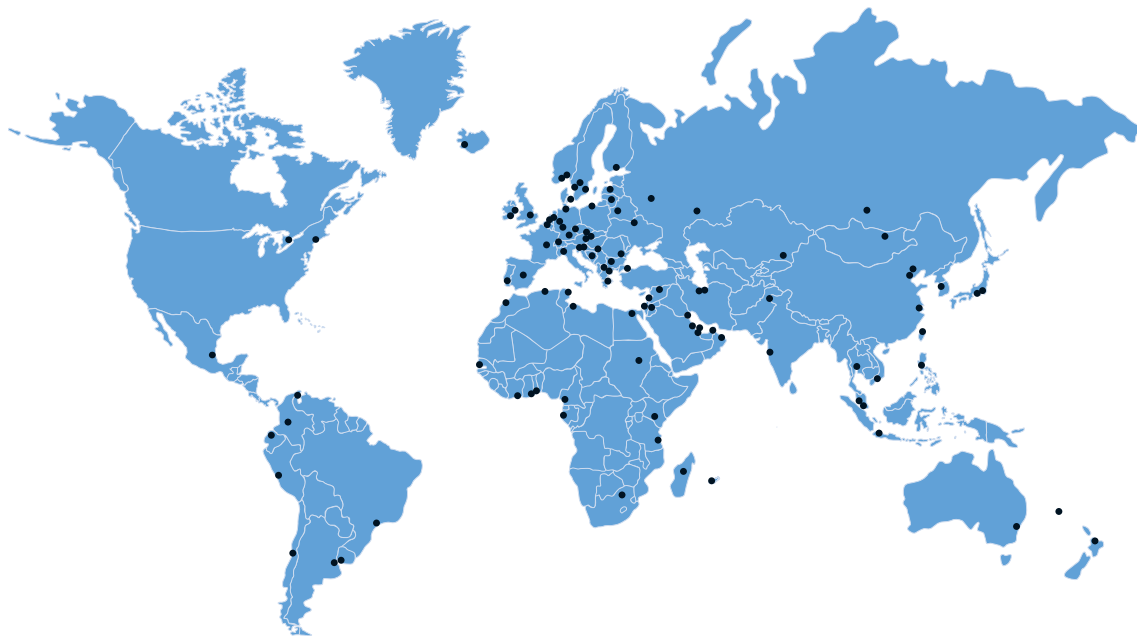
<p>You are on the main menu level. Press ↓ or ↑ until the submenu SETPOINT/RELAYS is highlighted. Press ← to enter the chosen menu.</p>
<p>SETPOINT / RELAYS SETUP</p> <p>Dependig on the installed card select either the input channel you wish to edit Press ↓ or ↑ until the submenu you wish to edit is highlighted. For example</p> <p>SETPOINT 1 → CHANNEL 1 (SENSOR) SETPOINT 2 → CHANNEL 1 (TEMP) SETPOINT 3 → CHANNEL 2 (SENSOR) SETPOINT 4 → CHANNEL 3 (SENSOR) SETPOINT 5 → CHANNEL 2 (CLEANING) SETPOINT 6 → UNIT ALARM</p> <p>Press ← to enter the chosen menu.</p>
<p>SETPOINT 1 SETUP</p> <p>Press ↓ or ↑ until the submenu INPUT SOURCE and the associated submenu CLEANING is highlighted. Press ← to enter the chosen menu.</p> <p>Enter the access code with the help of ↓ or ↑. The default security access code is 1000</p> <p>Now you have the oppurtunity to adjust the CLEAN DURATION / CLEAN INTERVAL / TIME REMAINING / CLEAN MODE / CLEAN RECOVERY / CLEAN DELAY / MANUAL CLEAN</p> <p>CLEAN DURATION Enter the desired duration Enter the duration of the cleaning operation. For the duration of the clean, cleaning will appear in the associated sensor input display section on the front screen.</p> <p>CLEAN INTERVAL Enter the desired interval Enter the duration of the cleaning operation. For the duration of the clean, cleaning will appear in the associated sensor input display section on the front screen.</p> <p>TIME REMAINING Shows the time remaining till the next clean operation. Note – Cannot be edited.</p> <p>CLEAN MODE Select ON-LINE / OFF-LINE Associated sensor input channel state when cleaning. It is recommended that off-line is selected. This will automatically take the associated sensor input channel offline, de-energise associated setpoints and hold associated current outputs, during a clean operation. This will prevent any undesired control actions resulting from spraying cleaning solution onto the sensor.</p> <p>CLEAN RECOVERY - Signal hold time Enter the desired recovery (Signal hold time) If cleaning “Off-line” then the user can introduce an additional post cleaning delay before coming back “On-line”, this provides the sensor a period to stabilise.</p> <p>CLEAN DELAY Select YES / NO If enabled this causes the clean cycle to wait if any other control setpoints associated with the sensor input channel are active. This is shown by a clean delayed message on the front screen.</p> <p>MANUAL CLEAN Select YES / NO This manually starts a clean cycle. Note this can also be accomplished via the digital inputs, see Digital Inputs section.</p> <p>Press EXIT several times to return to the measuring mode.</p>

5.1 Order code

The characters of the order code highlighted in light grey describe the standard.

VGA Z 4	Type / housing converter	
	1	MAC 300 (wall mount)
	2	MAC 300 (rack mount)
	Power supply	
	1	Universal 85...265 V AC or DC, 15 W max.
	2	Low Voltage 18...32 V AC or DC, 20 W max.
	Mounting kit for channel input 3 and communication card	
	0	None (standard for MAC 300 R)
	1	Mounting kit 1: for channel input 3 and communication card
	2	Mounting kit 2: for channel input 3 and 5 analogue outputs communication card
	Expansion communication card	
	0	Standard 1 x 4...20 mA / 2 x relay
	1	Additional 1 x 4...20 mA / 2 x relay
	2	Additional 3 x 4...20 mA
	3	Additional 3 x 4...20 mA / 4 x relay
	4	Additional 5 x 4...20 mA / 2 x relay
	5	Additional Modbus, 4 x relay
	Sensor input card 1	
	1	Conductive conductivity
	3	pH / ORP
	5	Auxiliary mA
	6	Total suspended solids
	7	Turbidity
	Sensor input card 2	
	0	None
	1	Conductive conductivity
	3	pH / ORP
	5	Auxiliary mA
	6	Total suspended solids
	7	Turbidity
VGA Z 4		Continued on next page

	Sensor input card 3	
	0	None
	1	Conductive conductivity
	3	pH / ORP
	5	Auxiliary mA
	6	Total suspended solids
	7	Turbidity
	Data logging and trending	
	0	None
	1	Data logging and live trending software
	Approvals	
	0	None
	Cable glands	
	0	None
	1	6 x M20 & 5 x M16 pre-installed
	Operation language	
	1	English
	3	French
	4	Spanish
	5	Italian
	Documentation	
0	None	
1	English	
2	German	
3	French	
Carried over from previous page		
		Complete order code



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