

Electronic Pressure Switch EDS 300

User manual



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1. Functions of the EDS 300

Depending on the model, the unit offers the following functions:

- Display of the actual pressure, maximum value or a switching point.
- Switching the switching outputs according to the pressure and the pre-set switching parameters.
- Analogue output
- Menu for basic settings (adapting the EDS 300 to the particular application)
- Two different types of programming enable

Three different output models are available:

- EDS 300 with 1 switching output (1.2 A load capacity, no analogue output)
- EDS 300 with 2 switching outputs (1.2 A load capacity, no analogue output)
- EDS 300 with 1 switching output (1.2 A load capacity) and 1 analogue output (4...20 mA)

2. Mounting

The EDS 300 can be mounted directly onto a hydraulic block via the pressure connection (7/16 SAE 4 female).

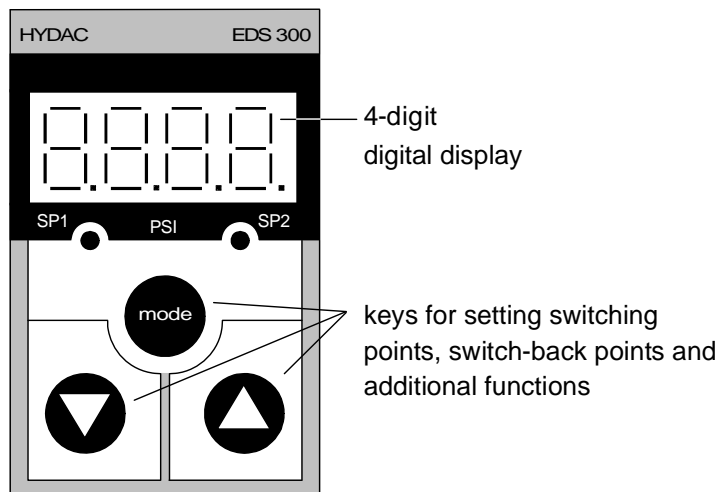
When used in critical applications (e.g. strong vibrations or knocks) the pressure connection must be mechanically decoupled via a Minimesse hose. Mounting clamps are available as an accessory (see point 12.2 "Accessories - for mechanical connection").

The electrical connection should be carried out by a qualified electrician according to the relevant regulations of the country concerned (VDE 0100 in Germany). The pressure switch housing must be earthed properly at the same time. When fitted into a hydraulic block it is sufficient if the block is earthed via the hydraulic system. In the case of Minimesse hose-mounting, the housing must be earthed separately.

Additional assembly notes which, from experience, reduce the effect of electromagnetic interference:

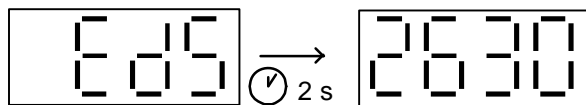
- Make line connections as short as possible.
- Use screened lines (e.g. LIYCY 4 x 0.5 mm²)
- The cable screening must be fitted by qualified personnel subject to the ambient conditions and with the aim of suppressing interference.
- Direct proximity to connecting lines of user units or electrical or electronic units causing interference must be avoided as far as possible.

3. Operating keys on the membrane keypad



4. Digital display

After switching on the supply voltage, the unit briefly displays "EdS" followed by the current pressure.



In the basic settings the display can be altered. For example, the maximum value can be permanently displayed. This is the largest measured value which has been recorded since the unit was switched on or was last re-set. A switching point can likewise be permanently displayed or the display can be set to be dark. Depending on the setting, "TOP", "S.P. 1", "S.P. 2" or "OFF" appears briefly on the display following the switch-on message.

The actual pressure can be displayed briefly by pressing the ▼ or the ▲ key. This causes the maximum value to be re-set.

Notes:

- If the actual pressure exceeds the nominal pressure of the unit, it can no longer be displayed and the display begins to flash.
- If the actual pressure is below 1 % of the nominal range, then 0 is displayed.

5. Output function

5.1 Switching outputs

The EDS 300 has 1 or 2 switching outputs. The following settings can be made under the basic setting:

5.1.1 Switching point setting (SP)

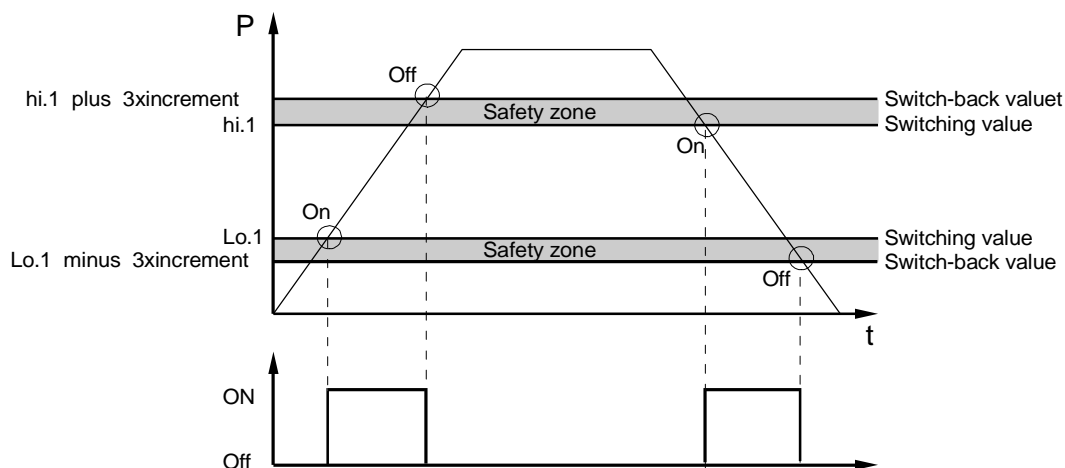
One switching point and one hysteresis can be set for each switching output. The respective output switches when the pre-set switching point is reached and switches back when the pressure falls below the switch-back point. The switch-back point is determined by the pre-set hysteresis (switch-back point = switching point minus hysteresis).

Abbreviations: "S.P.1", "S.P.2" = switching point 1 or 2
"h.Y.1", "h.Y.2" = hysteresis 1 or 2

5.1.2 Window function setting (WIN)

The window function enables a range to be monitored. For each switching output, in each case an upper and a lower switching value can be input which determine the range. The respective output switches when the pressure enters this range. Upon leaving the range, i.e. when the switch-back value has been reached, the output switches back. The lower switch-back value is just below the lower switching value (lower switching value minus three times the increment, see point 5.4). The upper switch-back value is just above the upper switching value (upper switching value plus three times the increment, see point 5.4). The area between switching and switch-back value forms a safety zone which prevents unwanted switching operations from occurring (e.g. triggered by pulsations from a pump).

Example for switching output 1 (normally open function):



Abbreviations: "hi.1", "hi.2" = High level 1 or 2 = upper switching value 1 or 2
"Lo.1", "Lo.2" = Low level 1 or 2 = lower switching value 1 or 2

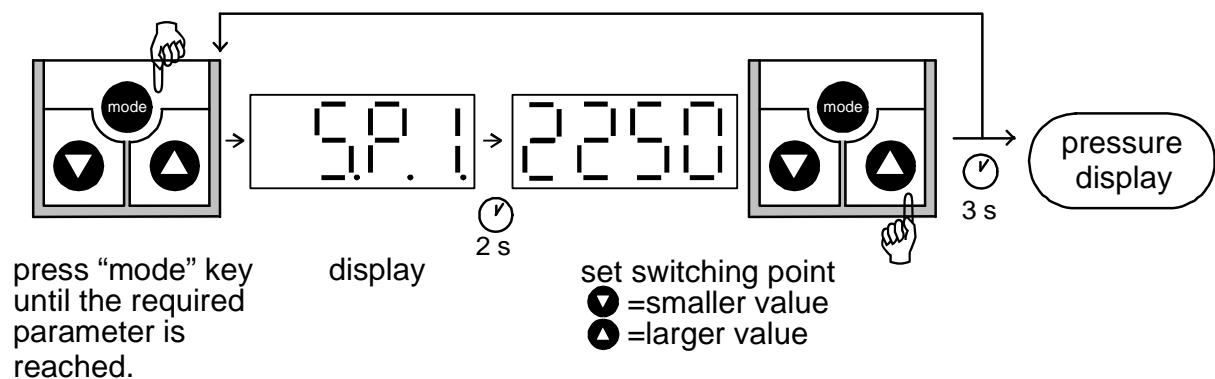
Note: The window function only operates correctly (switching on and off), when all switching values (including the safety zone) are greater than 0 bar and lower than the nominal pressure range.

5.2 Analogue output

On specified models, the EDS 300 provides one analogue output with a 4...20 mA signal.

5.3. Setting the Switching Points and Hystereses

- Press "mode" key
- "S.P.1" or "hi.1" is displayed
- Keep pressing the "mode" key until the required parameter is displayed (depending on the basic setting: "S.P.1", "h.Y.1", "S.P.2", "h.Y.2", "hi.1", "Lo.1", "hi.2" or "Lo.2").
- After 2 seconds the actual setting flashes.
- Use the ▼ or the ▲ keys to alter the setting.
- Use the "mode" key to call up other parameters, if required, and alter the setting using the ▼ and the ▲ keys.
- If no keys are pressed for 3 seconds, the display changes back and the settings are saved.



Notes:

- If "LOC" appears in the display when trying to alter the settings, programming is disabled.
Corrective action: set programming enable to "ON"
(see point 7 "Programming enable")
- If the ▼ or the ▲ key is held down during alteration, the value automatically advances.
- If a setting has been altered, "PRG" appears briefly in the display when the display is switched over. The new setting is then saved in the unit.

5.4 Setting ranges of the switching points and/or hystereses

Measuring range in psi	Switching point and/or upper critical value in bar	Hysteresis and/or lower critical value in bar	Increment * in psi
-14 .. 75	-12.5 .. 75.0	-0.5 .. 74.0	0.5
0 .. 150	3 .. 150	1 .. 148	1
0 .. 1000	15 .. 1000	5 .. 990	5
0 .. 3000	45 .. 3000	15 .. 2970	20
0 .. 6000	90 .. 6000	30 .. 5940	30
0 .. 9000	150 .. 9000	50 .. 8900	50

* All ranges given in the table are adjustable by the increments shown.

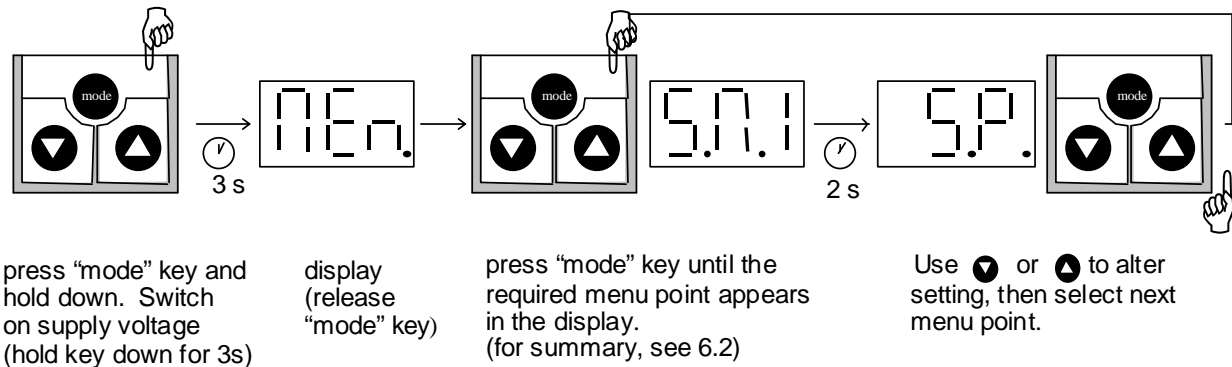
6. Basic settings

In order to adapt the unit to a particular application, the function of the EDS 300 can be altered via several basic settings. These are combined in a menu.

6.1 Altering the basic settings

Important note: when the menu is activated no switching operations are carried out.

Switch off supply voltage or disconnect the unit from the supply voltage.



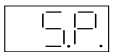
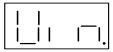
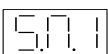
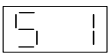
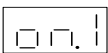
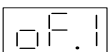
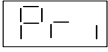
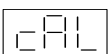
To close the basic setting menu

Call up the menu point **"END"**, set to **"YES"**, the EDS 300 returns to the normal display mode after 2 seconds.

Note:

If after about 50 seconds no keys have been pressed, the menu automatically closes down. Any changes which may have been made will not be saved.

6.2 Summary of the basic settings

Setting	Display	Setting range	Pre-setting
Switching mode switching output 1 (Sm 1)  Switching output 1 operates in switching point / hysteresis function  Switching output 1 operates in window function		SP/ Win	SP
Switching direction switching output 1 (S 1) "ON": normally open function. "OFF": normally closed function.		ON/ OFF	ON
Switch-on delay switching output 1 (Ton 1) Time in seconds which must elapse, once the particular switching point has been reached or exceeded, before switching will occur.		0.00..75s	0
Switch-off delay switching output 1 (Toff 1) Time in seconds which must elapse, once the pressure has fallen below the particular switch-back point, before switching will occur.		0.00..75s	0
Switching output 2, as above			
Primary display (Primary) Display value which should remain permanently in the display: "ACT.": base pressure "Top": pressure peak value "S.P.1" or "S.P.2": switching point 1 or 2 "OFF": display dark (for function, see point 4 "Digital display")		ACT/ Top/ S.P.1/ S.P.2/ OFF	ACT
Calibration of sensor zero point (Calibrate) "YES": The base pressure is saved as the new zero point. This is possible in the range +/- 3 % of the unit's nominal pressure range. "new" appears in the display when a calibration is carried out in the permissible range, otherwise "Err" is displayed. This function is useful for example if there is always a residual pressure in the system which should however be displayed as 0 bar.		YES/ NO	NO
<p><u>Please note:</u> Following a zero point adjustment, for example, on a 600 bar unit, a pressure of up to 18 bar is displayed as 0 bar. Before any work is carried out on the hydraulic system, ensure that the system is de-pressurised.</p>			

Version number (Version)

UEr

Display of the current software version (for reference only)

To close basic settings (End)

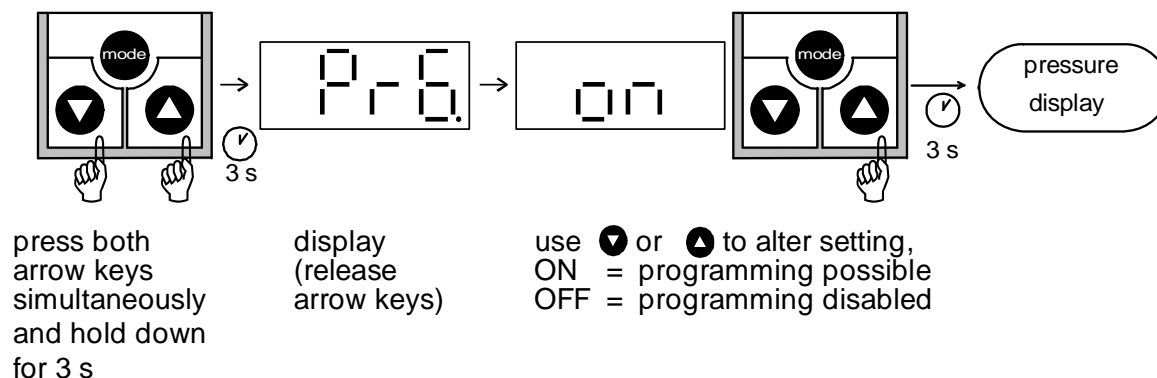
End

YES/ NO NO

7. Programming enable

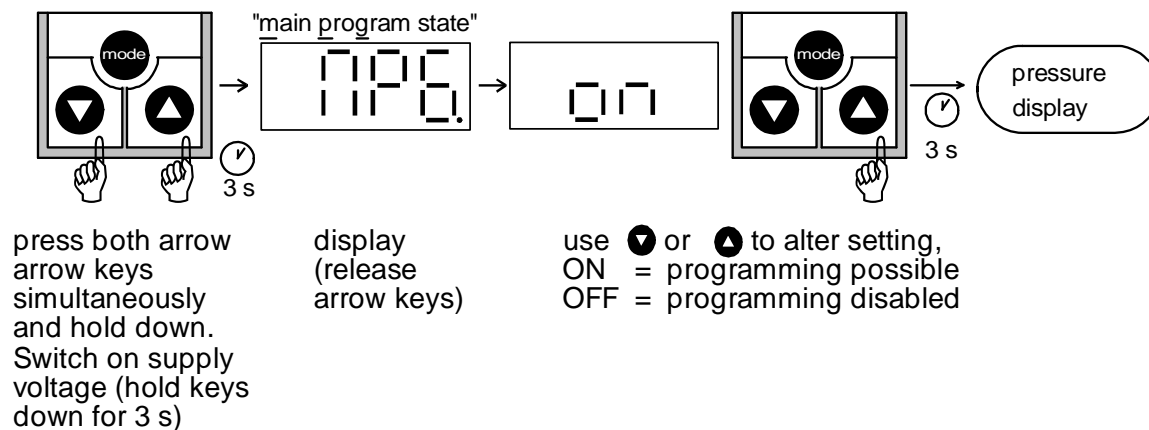
The unit has 2 types of programming enable which must both be set to "ON" to change the settings. The operating programming enable can be set or removed during operation. It provides protection from unintentional alteration. A programming disable via the main programming enable has the effect that no change to the settings can be carried out during operation. This serves, for example, as a safety function or as protection against unauthorised alterations.

7.1 Altering the operating programming enable



7.2 Altering the main programming enable

Switch off supply voltage or disconnect the unit from the supply voltage.



Note:

- If a setting has been changed "**PRG**" is displayed briefly when the display is switched over. The new setting is then saved in the unit.

8. Error messages

If an error is detected, then a corresponding error message appears which must be acknowledged by pressing any key. Possible error messages are as follows:

E 01 The switching points and hystereses have been set in such a way that the resulting switch-back point is no longer within the permissible setting range.

Corrective action: Correct the settings

E 10 A data error has been detected in the saved settings. Possible causes are strong electromagnetic interference or a component fault.

Corrective action: Check all the settings (programming enable, switching points, switch-back points and basic settings) and correct these if necessary. If the errors occur frequently, please contact Hydac Service.

E 12 An error has been detected in the stored calibration data. Possible causes are strong electromagnetic interference or a component fault.

Corrective action: Switch the unit off and on again. If the error message is still displayed, the unit must be returned to the manufacturer for re-calibration or repair.

E 20 A short-circuit has been detected on a switching output.

Corrective action: Eliminate the short circuit.

9. Technical specifications

Input data::	
Measuring ranges:	-14 .. 75; 150; 1000; 3000; 6000; 9000 psi
Overload pressures:	150 % FS, max. 13000 psi
Burst pressure:	300 % FS
Output data:	
Accuracy (B.F.S.L.) display & analogue including linearity & hysteresis	$\leq \pm 0.5$ % B.F.S.L.
Repeatability:	$\leq \pm 0.5$ % FS max.
Temperature drift: zero point max.	$\leq \pm 0.016$ % / °F ($\leq \pm 0.03$ % / °C)
range max.	$\leq \pm 0.016$ % / °F ($\leq \pm 0.03$ % / °C)
Analogue output:	4 .. 20 mA, ohmic resistance $\leq 400 \Omega$
Switching outputs:	
Type:	PNP transistor output
Switching current:	max. 1.2 A
Switching cycles:	≥ 100 million
Reaction time:	approx. 10 ms
Ambient conditions:	
Temperature range of medium:	-13 .. 176 °F (-25 .. + 80 °C)
Ambient temperature range:	-13 .. 176 °F (-25 .. + 80 °C)
Storage temperature range:	-40 .. 176 °F (-40 .. + 80 °C)
Compensated temperature range:	14 .. 158 °F (-10 .. + 70 °C)
CE mark:	EN 61000-6-1 / -2 / -3 / -4
Vibration resistance:	approx. 10 g / 0..500 Hz
Shock resistance:	approx. 50 g / 1ms
Other data:	
Supply voltage EDS 356-1,2:	12 .. 32 V DC
Supply voltage EDS 356-3:	20 .. 32 V DC
Electrical connection:	plug M12x1
Current consumption:	approx. 100 mA (without switching output)
Safety type:	IP 65
Hydraulic connection:	see model code
Parts in contact with medium:	stainless steel
Material of housing:	tube: stainless steel keypad housing: PA6.6 Gf30
Display:	4-digit, 7-segment LED, red
Weight:	approx. 300 g

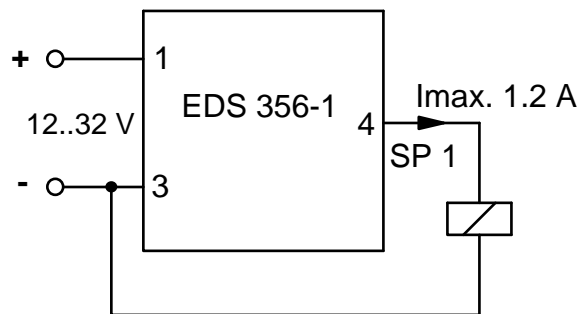
Note:

FS (Full Scale) = relative to the full measuring range

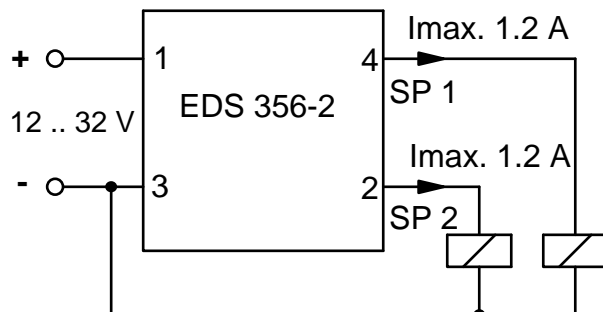
B.F.S.L. = Best Fit Straight Line

10. Circuit diagram

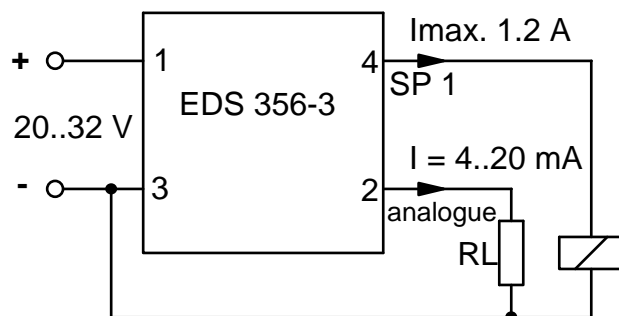
Model with 1 switching output



Model with 2 switching outputs



Model with 1 switching output and 1 analogue output



11. Model code

EDS 3 5 6 - X - XXXX - XXX

Series _____
 EDS 3 = 300 Series Electronic Pressure Switch

Mechanical connection _____
 5 = SAE-4 female thread (7/16-20 UNF2B)

Electrical connection _____
 6 = M12x1 plug, 4 pole (connector not included)

Output _____
 1 = 1 Switching output
 2 = 2 Switching outputs
 3 = 1 Switching output an 1 Analog output

Pressure ranges _____
 0089 (-14..75); 0150; 1000; 3000; 6000; 9000 psi

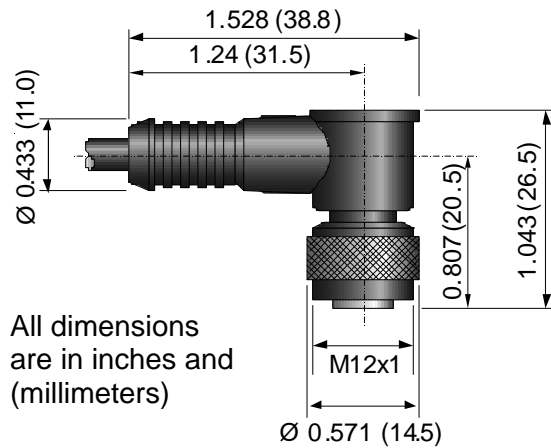
Modification number _____
 400 = standard in psi
 401 = vacuum in psi

12. Accessories

12.1 For electrical connection

4-pole connector with flying leads,
M12x1, 90° angled

Female interface



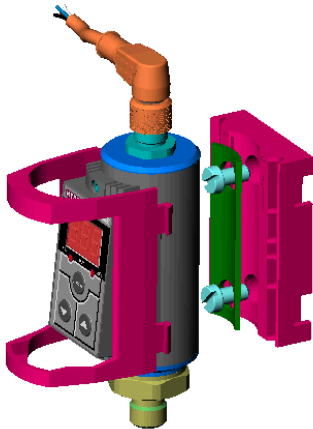
All dimensions
are in inches and
(millimeters)

Wire colors: Pin 1: brown, Pin 2: white, Pin 3: blue, Pin 4: black

Available types: **ZBE 06-02:** Female Screw-Lock Type 90° Connector (2 meter cord)
ZBE 06-05: Female Screw-Lock Type 90° Connector (5 meter cord)

12.2 For mechanical connection

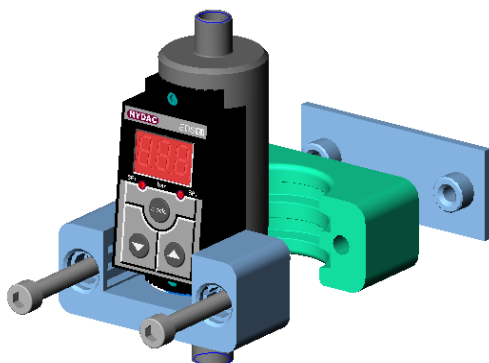
ZBM 300 clamp for wall-mounting the EDS 300 (material: polypropylene)



Mounting:

- Glue damping strips into the recesses of the base plate.
- Mount base plate, the top is indicated by "OBEN", "TOP" and 2 arrows.
- Insert EDS 300.
- Fit clip (only one possible position) and press hard on the cross-pieces until they engage.

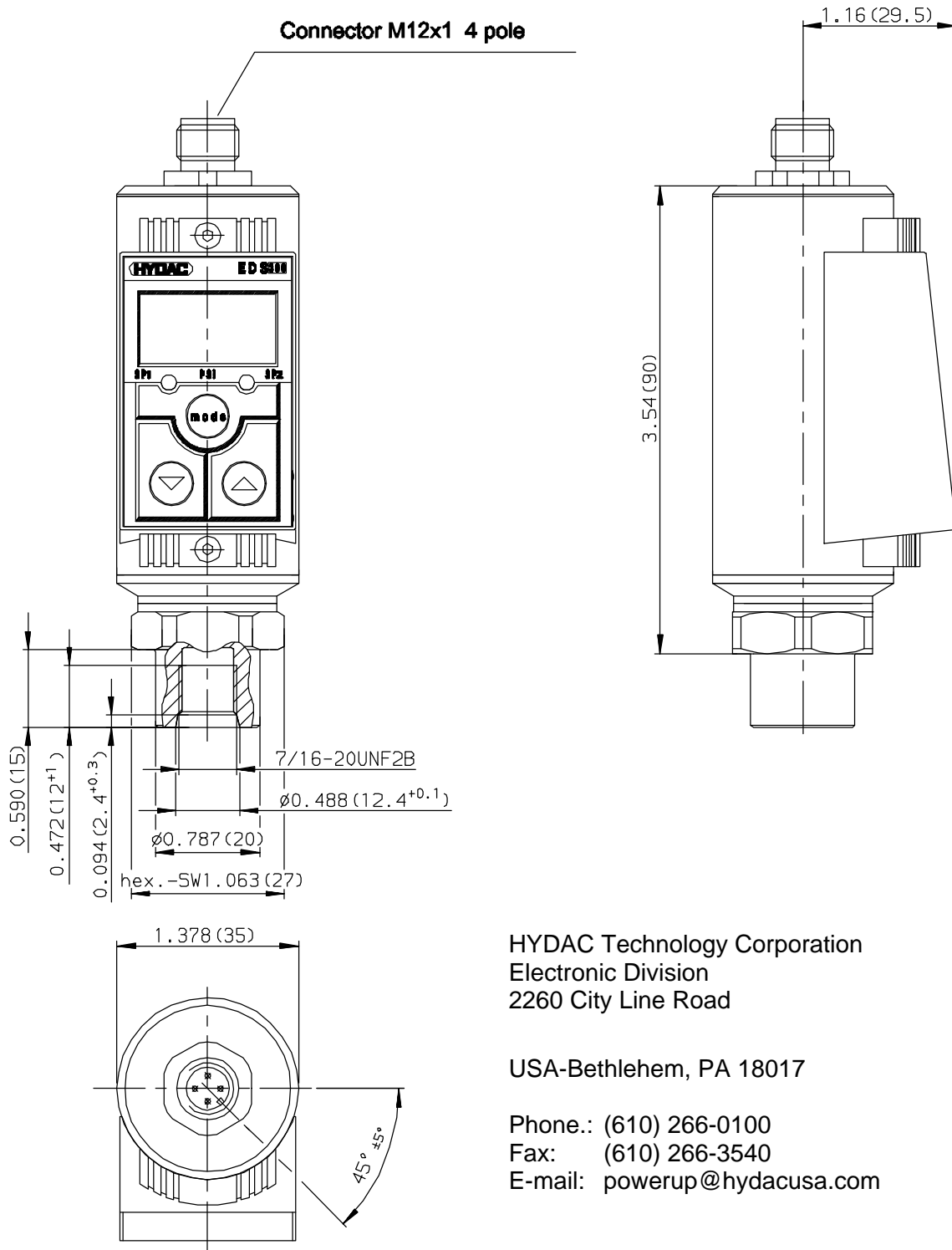
ZBM 310 clamp for wall-mounting the EDS 300 (material: polypropylene, aluminium AISi12, steel)



Mounting:

- Weld the steel base plate
- Mount EDS 300 in accordance with the drawing

13. Dimensions



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