EN

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MANUAL

DIFFERENTIAL PRESSURE TRANSMITTER

TPDAxxxxCx

Modbus

Manual TPDAxxxxCx

DISCLAIMER

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Chapter 1 **About TPDAxxxxCx**

TPDAxxxxCx is a range of pressure transmitters with one or two pressure sensors, two universal inputs and an RS485 port for data exchange. The RS485 port can be easily configured for either EXOline or Modbus communication. The transmitter can be used as a slave unit in an EXOline or Modbus system.

The transmitter has two universal inputs which can be individually configured as digital or analogue inputs (PT1000/Ni1000 sensor or 0…10 V).

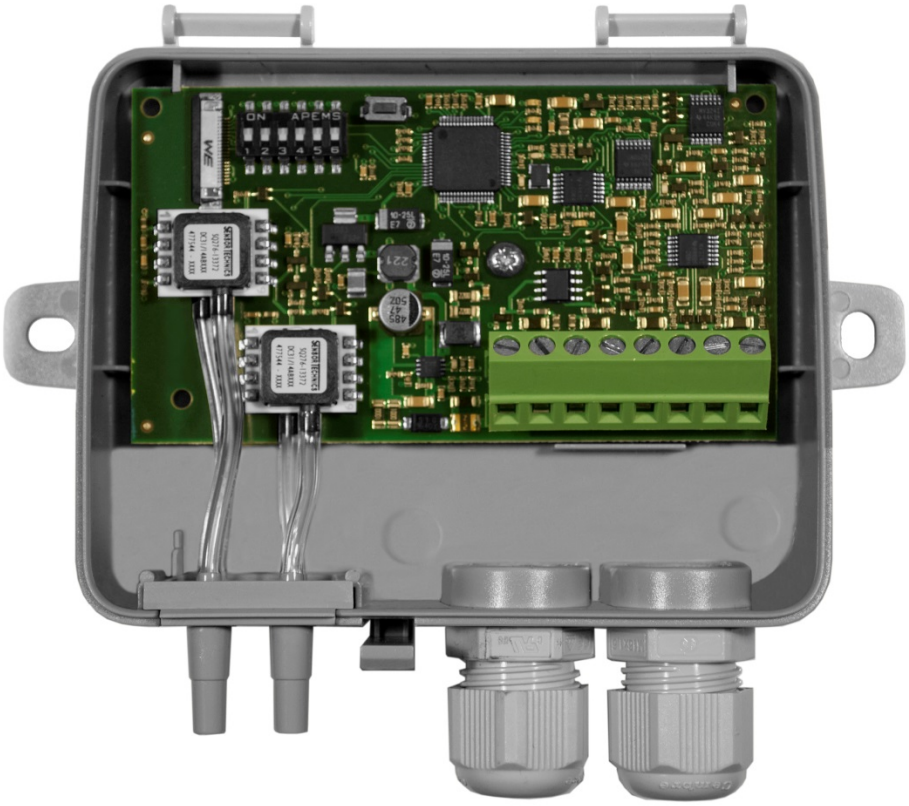
The transmitter has one or two dual-chip sensor modules for general use with neutral gases. The sensors are connected to pressure and flow outputs. For pressure, the output unit is selectable in Pa, mmH_2O, inH_2O or mBar. For flow, the output unit is selectable in l/s, Ft^3/min or m^3/h.

The units feature a pushbutton for zero-set calibration and factory reset.

Applications

The transmitter is especially well suited as a distributed I/O module for air handling unit controllers. It operates as a Modbus or EXOline slave that expands the controller with up to two analogue pressure and two universal inputs. You can choose whether flow or volume data will be sent. A single unit will usually cover half the measuring requirements of one typical air handling unit (fan, filter and two temperatures).

Inside TPDAxxxxCx



Technical data

Supply voltage ..... 24 V AC/DC ±15 %
Protection class IP54
Calculated power consumption ..... 2 VA (rms). Minimum transformer size 7.5 VA.
Data transmission channel ..... Non-isolated RS485 (max. 100 m)
Overall accuracy, pressure ..... ≤ 1 % full scale
Annual drift ..... Typically ±4 Pa (for TPDA25C2)
Damping (settable) ..... 1…12 s
K-factor (settable) ..... 5…700
Operating temperature range ..... -25…+50°C
Operating humidity ..... Max. 95 % RH (non-condensing)
Overvoltage on any terminal ..... Max. ±18 V (referenced to GND)

Universal inputs UI1, UI2

Configured as	Ambient temperature	Accuracy	Range
PT1000*	-25...0°C	±1 K	-40...+60°C alt. -40...140°F
	0...50°C	±0.5 K	
Ni1000; 6180 ppm/K	-25...0°C	±1 K	-40...+60°C alt. -40...140°F
	0...50°C	±0.5 K	
0...10 V	-	± 1 % full scale	-
Digital input	Potential-free contacts on/off (closed=on)		

** Factory setting*

Pressure ranges (full scale)

Model		Pa (factory setting)	mBar	mmH_2O	inH_2O
TPDA12C	*PS1*	0…1250	0…12.5	0…125	0…5
TPDA25C	*PS1*	0…2500	0…25	0…250	0…10
TPDA75C	*PS1*	0…7500	0…75	0…750	0…30
TPDA12C2	*PS1*	0…1250	0…12.5	0…125	0…5
	PS2	0…1250	0…12.5	0…125	0…5
TPDA1225C2	*PS1*	0…1250	0…12.5	0…125	0…5
	PS2	0…2500	0…25	0…250	0…10
TPDA25C2	*PS1*	0…2500	0…25	0…250	0…10
	PS2	0…2500	0…25	0…250	0…10
TPDA1275C2	*PS1*	0…1250	0…12.5	0…125	0…5
	PS2	0…7500	0…75	0…750	0…30

NOTE: The suffix in the name denotes the number of sensors in the unit.

- No suffix = One sensor (only PS1 is present, reading PS2 related parameters will yield a zero value reading)
- -2 = Two sensors

Flow settings

The following flow ranges apply when selecting a unit of measurement for flow measurement:

Unit	Flow ranges (full scale)
l/s	0…31000
m^3/h (factory setting)	0…65000
CFM [Ft^3/min]	0…65000

Chapter 2 **Installation and wiring**

Installation

NOTE: Use a shielded, twisted pair cable for RS485 communication. At high risks of interference, a 120 Ω terminating resistor should be mounted at each end of the communications circuit.

1. Mount the transmitter horizontally or vertically on a stable, vibration-free surface. If the unit is installed in a humid environment, install it vertically with the cable gland edge of the unit pointing down to allow moisture to escape.
2. For wiring, see diagram on the next page. Connect the communication cable to terminals 3(B) and 4(A). Use the leftmost cable gland for supply voltage and communication. Use the rightmost cable gland for the universal inputs.
3. Set the DIP-switches to their desired settings. DIP-switch 6 can be used to offset the ELA address to allow setting up two units at the same time. The transmitter uses the address 1 as a default address for Modbus. For EXOline, dual sensor transmitters use 242:1 as default address and single sensor transmitters use 242:3 as their default address. See chapter 3.
4. Power up the unit. Refer to the variable tables in chapter 5 “Units and variables” for information on how to access transmitter data.
5. Let the unit warm up for 10 minutes, then perform a zero-set calibration by pressing the pushbutton.
6. Connect plastic tubes from the ventilation duct to the pressure inlets. **NOTE:** A straight cut off nipple must be used for mounting in the ventilation duct.

   For optimal measuring results, measuring points with turbulent air flow should be avoided. Preferably, measuring should be performed at a distance of 2 duct diameters before bends and branching and at 6 duct diameters after bends and branching.

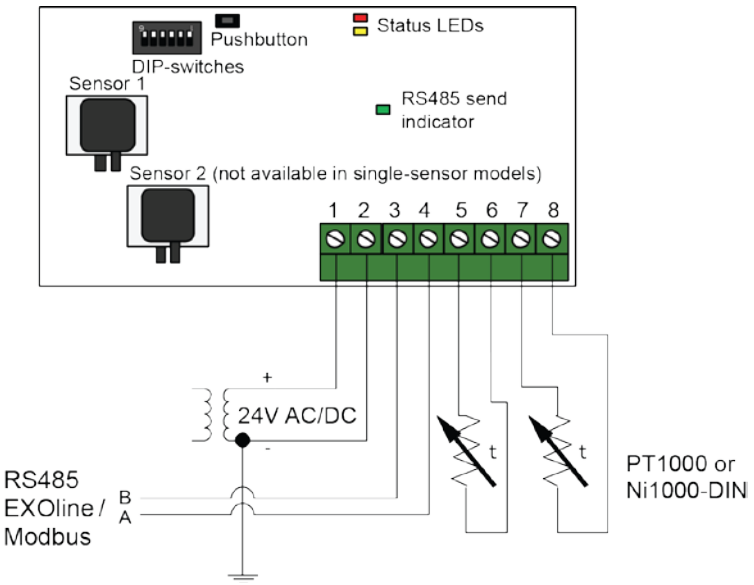
Wiring

1. G (+)
2. G0 (-)
3. RS485 EXOline/Modbus “B”
4. RS485 EXOline/Modbus “A”
5. UI1 Input
6. UI1 GND
7. UI2 Input
8. UI2 GND

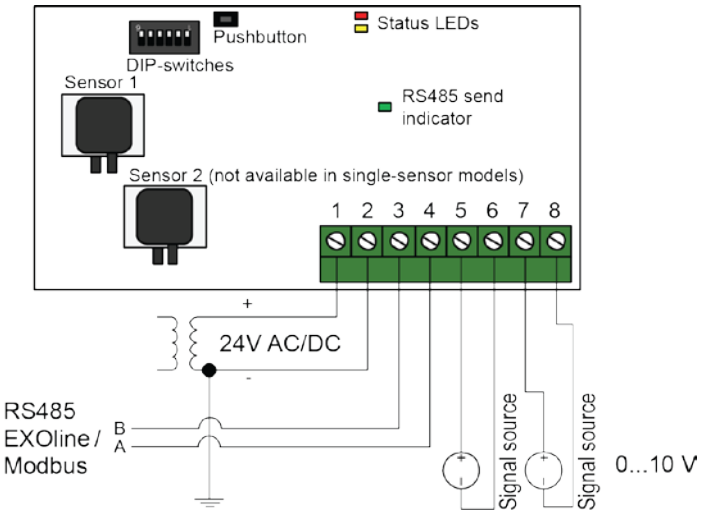
Terminals 2, 6 and 8 are internally connected (GND/G0).

Note that the universal inputs can be individually configured for either PT1000/Ni1000, 0...10 V or digital input.

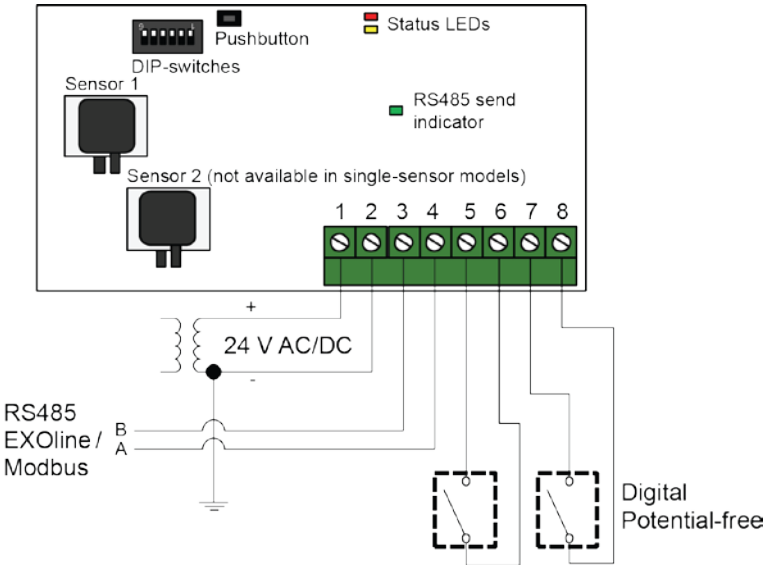
Wiring with UIx as temperature input



Wiring with UIx as 0...10 V input



Wiring with UIx as digital input



Chapter 3 Commissioning and changing of address

The transmitter can be configured either by using the DIP-switches or via EXOline or Modbus.

The last configuration entered into the transmitter is always valid, regardless of whether it was performed using the DIP-switches or via EXOline or Modbus.

Configuration via DIP switches

The transmitter features DIP-switches for setting up suitable communication parameters. These settings can later be overridden by commands sent via EXOline or Modbus.

If configuration is performed using the DIP-switches, the transmitter must then be powered down and powered up again for the parameters to change in accordance with the DIP-switch settings.

Upon delivery, all DIP-switches are set to the OFF position, which gives: EXOline protocol with 9600 baud, odd parity and no address offset added (see table 1 below).

DIP-switch	Parameter	Key pattern	Parameter setting
1 and 2	Baud rate	**1 = OFF / 2 = OFF**	**9600 bps**
		1 = ON / 2 = OFF	14400 bps
		1 = OFF / 2 = ON	19200 bps
		1 = ON / 2 = ON	38400 bps
3 and 4	Parity bit	**3 = OFF / 4 = OFF**	**ODD parity**
		3 = ON / 4 = OFF	EVEN parity
		3 = OFF / 4 = ON	NO parity, ONE stop bit*
		3 = ON / 4 = ON	NO parity, TWO stop bits*
5	EXOline or Modbus (selectable)	**OFF**	**EXOline**
		ON	Modbus
6	EXOline ELA address offset	**OFF**	**No offset added**
		ON	ELA = ELA + 1

Table 1

** When no parity is used, the Modbus standard is two stop bits.*

Bold = Factory setting

Factory reset

If a factory reset is performed using the pushbutton, the DIP-switches should be restored to their factory setting (OFF), otherwise their settings will be read again.

NOTE: All changes made with EXOline or Modbus will be reset if the pushbutton is pressed for 10 seconds or longer. All DIP-switch settings will then be read, including DIP-switch 6.

Pushbutton

Quick press: Zero-set pressure sensors.

NOTE: Be sure to disconnect the pressure tubes before doing this.

The yellow LED will light up while the zeroing operation is in progress. Let the unit warm up for 10 minutes before attempting zero-set.

Long press (10 s): Reset software factory settings.

The red and yellow LEDs will flash alternating for the duration of the operation. The unit will then reset and restart.

If a factory reset is performed using the pushbutton, the DIP-switches should be restored to their factory setting (OFF), otherwise their settings will be read again.

Status LED

The red status LED will light up at power-on and go out after a few seconds when the on-board sensory circuitry is ready for operation. If the LED lights up during normal operation, an error has occured. Read the global status variable via communication to determine the fault cause. See "Status variable" below.

If the yellow LED is blinking, it means the zero-set calibration has been performed incorrectly. In these cases, the transmitter will instead use the latest correctly performed calibration.

Status variable

The global status variable should be read via communication on a regular basis to detect any malfunctions in the transmitter.

Summary of implemented states:

Value	Description
Bit 0	The unit is ready for use
Bit 1	Sensor type unknown
Bit 2	Internal (system) error
Bit 3	The calibration was lost
Bit 4	Universal input channel(s) parameter error. The unit will attempt to restart in 5 seconds. It will not work until the mode register contains valid data.
Bit 5	Pressure input channel(s) parameter error. The unit will attempt to restart in 5 seconds. It will not work until the mode register contains valid data.
Bit 6	Internal. Reserved for testing.
Bit 7	Internal. Reserved for testing.

Table 3

Chapter 4 Calculation of fan unit air flow using TPDAxxxxCx

TPDAxxxxCx can be set to calculate flow based on the calculated, measured flow from PS1 (AI1) and/or PS2 (AI2). In order to measure flow, it is necessary to first know the pressure drop across the fan, the density of the medium (air), as well as the K-factor of the fan.

K-factor

The ability of the fan to move air is specified by the K-factor. A large fan will displace more air than a small one.

Air density

The flow will also be affected by air density. The density will, in turn, be affected by air temperature.

Complete formula for flow calculation

The formula for flow calculation is:

$$Q_v = K * \sqrt{\frac{2}{\rho}} * \sqrt{\Delta P_m}$$

Q_v = Calculated air flow

K = K-faktor (numeric value providing Q_v in m^3/h)

ρ = Air density at current temperature (often set to 20°C where it is approx. 1.2 kg/m^3)

ΔP_m = The measured differential pressure in Pascal

Compound K-factor (simplified)

The transmitter will always use the pressure value in Pascal for calculations, and it is important to always use that K-factor which results in m^3/h. It is then possible to select the flow unit in which the results should be presented by setting QAnain.AIMode3 and QAnain.AIMode4 to the desired mode. Choose between displaying cubic meters per hour (m^3/h), litres per second (l/s) or cubic feet per minute (Ft^3/min) when reading the variables QAnain.AI3 and QAnain.AI4.

Simplified formula

The air density at 20°C is often used since changes in air density are small in a limited temperature range and you only want to take the pressure difference into account. This often results in an approximate value that is sufficient, since most air handling units operate near this temperature. The manufacturer of the air handling unit always states the K-factor of a specific unit, of which air density will frequently be a part. Specifications for the K-factor should always be stated. Some manufacturers leave the density out altogether and you will have to factorize K with the $\sqrt{(2/\rho)}$ expression yourself using a temperature of your choosing.

If the K-factor already takes air density into account, this results in a simplified formula:

$$Q_v = K_{unit} * \sqrt{\Delta P_m}$$

K_{unit} = Composite K-factor (both K-factor and density at, for instance, 20°C in the same figure)

ΔP_m = The measured differential pressure in Pascal

Normally, the K-factor for a unit is given with different measuring units so it does not have to be recalculated for different resulting flow units such as: m^3/h, l/s, Ft^3/min, etc.

Chapter 5 **Units and variables**

Unit-of-measure (UOM) choices for pressure sensor 1 TPDA12C

Value	Unit	Description	Unit range
0	Pa (factory setting)	Pascal	0…1250
1	mBar	Millibars	0…12.5
2	mmH_2O	Millimeters of water	0…125
3	inH_2O	Inches of water	0…5

Table 4

Unit-of-measure (UOM) choices for pressure sensor 1 TPDA25C

Value	Unit	Description	Unit range
0	Pa (factory setting)	Pascal	0…2500
1	mBar	Millibars	0…25
2	mmH_2O	Millimeters of water	0…250
3	inH_2O	Inches of water	0…10

Table 5

Unit-of-measure (UOM) choices for pressure sensor 1 TPDA75C

Value	Unit	Description	Unit range
0	Pa (factory setting)	Pascal	0…7500
1	mBar	Millibars	0…75
2	mmH_2O	Millimeters of water	0…750
3	inH_2O	Inches of water	0…30

Table 6

Unit-of-measure (UOM) choices for pressure sensors 1 & 2 TPDA12C2

Value	Unit	Description	Unit range, PS1	Unit range, PS2
0	Pa (factory setting)	Pascal	0…1250	0…1250
1	mBar	Millibars	0…12.5	0…12.5
2	mmH_2O	Millimeters of water	0…125	0…125
3	inH_2O	Inches of water	0…5	0…5

Table 7

Unit-of-measure (UOM) choices for pressure sensors 1 & 2 TPDA12S25C2

Value	Unit	Description	Unit range, PS1	Unit range, PS2
0	Pa (factory setting)	Pascal	0…1250	0…2500
1	mBar	Millibars	0…12.5	0…25
2	mmH_2O	Millimeters of water	0…125	0…250
3	inH_2O	Inches of water	0…5	0…10

Table 8

Unit-of-measure (UOM) choices for pressure sensors 1 & 2 TPDA25C2

Value	Unit	Description	Unit range, PS1	Unit range, PS2
0	Pa (factory setting)	Pascal	0…2500	0…2500
1	mBar	Millibars	0…25	0…25
2	mmH_2O	Millimeters of water	0…250	0…250
3	inH_2O	Inches of water	0…10	0…10

Table 9

Unit-of-measure (UOM) choices for pressure sensors 1 & 2 TPDA12S75C2

Value	Unit	Description	Unit range, PS1	Unit range, PS2
0	Pa (factory setting)	Pascal	0…1250	0…7500
1	mBar	Millibars	0…12.5	0…75
2	mmH_2O	Millimeters of water	0…125	0…750
3	inH_2O	Inches of water	0…5	0…30

Table 10

Unit-of-measure (UOM) choices for flow sensors 1 & 2

Value	Unit	Description	Unit range
0	m^3/h (factory setting)	Cubic meters per hour	Floating point (depends on K-factor)
1	l/s	Liters per second	Floating point (depends on K-factor)
2	Ft^3/min	Cubic feet per minute	Floating point (depends on K-factor)

Table 11

The universal inputs can be set to different modes:

Universal inputs 1 & 2 mode selection

Value	Input type	Description	Unit range
0	None	-	-
1	PT1000 (factory setting)	Temperature – PT1000 input	-40…+60°C -40…+140°F
8	Ni1000	Temperature – Ni1000 input	-40…+60°C -40…+140°F
9	0…10 V	Voltage	0…10 V
6	Logic	Logic level – potential free input contacts	0/1

Table 12

Modbus variables

Input registers (function 04, read-only)

Reg	R/W	Description	Value	Scaling/Meaning
4x0000	R	Pressure sensor 1 reading. Most significant word of a 32-bit integer.	*See tables 4…10 (*)*	100
4x0001	R	Pressure sensor 1 reading. Least significant word of a 32-bit integer.		
4x0002	R	Pressure sensor 2 reading. Most significant word of a 32-bit integer.	*See tables 4…10 (*)*	100
4x0003	R	Pressure sensor 2 reading. Least significant word of a 32-bit integer.		
4x0004	R	Flow sensor 1 reading. Most significant word of a 32-bit integer.	*See table 11 (*)*	100
4x0005	R	Flow sensor 1 reading. Least significant word of a 32-bit integer.		
4x0006	R	Flow sensor 2 reading. Most significant word of a 32-bit integer.	*See table 11 (*)*	100
4x0007	R	Flow sensor 2 reading. Least significant word of a 32-bit integer.		
4x0008	R	Universal input 1 value. In °C in temperature mode, in Volts when 0…10 V mode.	-40…60°C 0…10 V	10
4x0009	R	Universal input 2 value. In °C in temperature mode, in Volts when 0…10 V mode.	-40…60°C 0…10 V	10
4x0010	R	Universal input 1 temperature in °Fahrenheit. Only valid in temperature mode.	-40…140°F	10
4x0011	R	Universal input 2 temperature in °Fahrenheit. Only valid in temperature mode.	-40…140°F	10
4x0012	R	Universal input 1 raw value	0…1500	
4x0013	R	Universal input 2 raw value	0…1500	
4x0014	R	Pressure sensor 1 raw value	0…30000	
4x0015	R	Pressure sensor 2 raw value	0…30000	
4x0016	R	Internal model number	1300…1399	
4x0017	R	Internal revision number	0…9999	
4x0018	R	Global device status	Bitfield	*See table 3*

Table 13

* Model dependent

Discrete inputs (function 02, read-only)

Reg	R/W	Description	Value	Scaling/Meaning
2x0000	R	Universal input 1 digital status (valid in digital mode only)	0/1	Open/Closed
2x0001	R	Universal input 2 digital status (valid in digital mode only)	0/1	Open/Closed

Table 14

Holding registers (function 03)

Reg	R/W	Description	Value	Scaling/Meaning
3x0000	R/W	Pressure sensor 1 mode (unit-of-measure)	*See tables 4…10*	Index
3x0001	R/W	Pressure sensor 2 mode (unit-of-measure)	*See tables 4…10*	Index
3x0002	R/W	Flow sensor 1 mode (unit-of-measure)	*See table 11*	Index
3x0003	R/W	Flow sensor 2 mode (unit-of-measure)	*See table 11*	Index
3x0004	R/W	Universal input 1 mode	*See table 12*	Index
3x0005	R/W	Universal input 2 mode	*See table 12*	Index
3x0006	R/W	Damping factor pressure sensor 1	1…120	10 (tenths of seconds)
3x0007	R/W	Damping factor pressure sensor 2	1…120	10 (tenths of seconds)
3x0008	R/W	K-factor for flow measurement, sensor 1	5…600	Unitless
3x0009	R/W	K-factor for flow measurement, sensor 2	5…600	Unitless
3x0010	R/W	RS485 port baud rate	See DPac description	Index (**)
3x0011	R/W	RS485 port mode/protocol	-	Index (***)
3x0012	R/W	RS485 port format	See DPac description	Index (**)
3x0013	R/W	Modbus unit ID	See DPac description	Index

Table 15

** Set via DIP-switch. Can be set to other values over the communication line (however this is not recommended and the procedure is outside the scope of this manual).

*** **Do not alter externally!** Set via DIP-switch.

Single coil (function 05)

Reg	R/W	Description	Value	Scaling/Meaning
5x0000	W	Restart device	0->1	Do a warm boot
5x0001	W	Zero-set pressure sensors 1 & 2	0->1	Zero calibrate (same action as pushing button)

Table 16

EXOline variables

DPAC Qsystem, load number 241

Variable name	Cell number	Variable type	Read/ Write	Variable description	Default value	Range/ Value	Value description
PLA	0	Index	R/W	PLA address	242	1-255	Byte
ELA	1	Index	R/W	ELA address	1 for dual sensor models, 3 for single sensor models	1-255	Byte
Ver_Minor	16	Index	R	Version (fractional part)	-	-	Fixed byte
Ver_Major	17	Index	R	Version (integer part)	-	-	Fixed byte
Model	36	Integer	R	Model of module	-	1301-1333	Integer
CPU_Speed	39	Index	R	CPU speed in MHz	16	16	Fixed byte
Ver_Branch	40	Index	R	Revision number (branch part)	-	-	Fixed byte
Ver_Number	41	Index	R	Revision number (number part)	-	-	Fixed byte
AsmModel	54	Integer	R	Application specific model	0	-	Number for identifying OEM variations
SerialNumberString	60	String	R	Device serial number	-	-	01YYMMDD XXXX
SVNVersion	80	Integer	R	SVN version of running firmvare	-	-	-
VendorName	109	String	R	Name of vendor	-	-	Name of vendor

Table 17

DPAC Qanain, load number 201

Storage classes: RA = RAM Only, EE = RAM with EEPROM mirror, FL = FLASH Only

Variable name	Cell number	Variable type	Storage class	Read / Write	Variable description	Default value	Range/ Value	Value description
AIMode1	1	Index	EE	R/W	Pressure mode for PSA sensor	0	0…3	*See tables 4…10*
AIMode2	2	Index	EE	R/W	Pressure mode for PSB sensor	0	0…3	*See tables 4…10*
AIMode3	3	Index	EE	R/W	Flow mode for PSA sensor	0	0…2	*See table 11*
AIMode4	4	Index	EE	R/W	Flow mode for PSB sensor	0	0…2	*See table 11*
AIMode5	5	Index	EE	R/W	Mode for UI1 input	1	0, 1, 6, 8, 9	*See table 12*
AIMode6	6	Index	EE	R/W	Mode for UI2 input	1	0, 1, 6, 8, 9	*See table 12*
AI1	18	Real	RA	R	Pressure value for PSA sensor	-	Varies with AIMode1 setting	Floating point value
AI2	21	Real	RA	R	Pressure value for PSB sensor	-	Varies with AIMode2 setting	Floating point value
AI3	24	Real	RA	R	Flow value for PSA sensor	-	Varies with AIMode3 setting	Floating point value
AI4	27	Real	RA	R	Flow value for PSB sensor	-	Varies with AIMode4 setting	Floating point value
AI5	30	Real	RA	R	Value for UI1	-	Varies with AIMode5 setting	Floating point value
AI6	33	Real	RA	R	Value for UI2	-	Varies with AIMode6 setting	Floating point value

Table 18

DPAC TPDADPac, load number 3

Variable name	Cell number	Variable type	Storage class	Read/ Write	Variable description	Default value	Range/ Value	Value description
Device_Status	0	Index	RA	R	Global device status as a bitfield	-	Bit 0…5	*See table 3*
DI1	1	Logic	RA	R	Digital input	-	0/1	Input status
DI2	2	Logic	RA	R	Digital input	-	0/1	Input status
Flow_K_Factor_PSA	10	Integer	EE	R/W	K-factor setting for flow	5	5…700	Integer value
Flow_K_Factor_PSB	12	Integer	EE	R/W	K-factor setting for flow	5	5…700	Integer value
Pressure_DampFactor_PSA	14	Integer	EE	R/W	Damping factor	10	10…120	Time in tenths of seconds
Pressure_DampFactor_PSB	16	Integer	EE	R/W	Damping factor	10	10…120	Time in tenths of seconds
Mode_Port_1	20	Index	EE	R/W	Serial port mode	DIP SW	2 15	EXOline Modbus
Format_Port_1	21	Index	EE	R/W	Serial port data format	DIP SW	16 48 112	8 bit data, no parity, 1 stop bit 8 bit data, even parity, 1 stop bit 1 stop bit 8 bit data, odd parity, 1 stop bit 1 stop bit
Baud_Port_1	22	Index	EE	R/W	Serial port bit rate	DIP SW	0 2 15 17	9600 Baud 2400 Baud 19200 Baud 38400 Baud
Extra_TimeOut_Port_1	23	Index	EE	R/W	Extra character timeout for port #1	0		(Unit: 4 ms)
ModbusUnitID	30	Index	EE	R/W	Modbus unit identification	1	1-247	Modbus address
ModbusCharTimeout_Port_1	31	Integer	EE	R/W	Modbus character timeout (ms)	3	-	Integer constant (1.5 x character speed)
ModbusAnswerDelay_Port_1	33	Integer	EE	R/W	Modbus answer delay (ms)	5	-	Integer constant (3.5 x character speed)
Nixus_WarmBoot	40	Logic	RA	W	Logic for commanding warm boot	-	1	Triggers warm boot

Variable name	Cell number	Variable type	Storage class	Read/ Write	Variable description	Default value	Range/ Value	Value description
Nixus_ZeroPSOffset	41	Logic	RA	W	Logic for commanding pressure sensor zeroing	-	1	Triggers zero offset of pressure sensors
NixusUI1_Deg_F	50	Real	RA	R	Temperature for UI1 in Fahrenheit	-	-40…+140	°F
NixusUI2_Deg_F	53	Real	RA	R	Temperature for UI2 in Fahrenheit	-	-40…+140	°F
NixusUI1_Raw	56	Real	RA	R	Raw value for UI1	-	Mode dependent	Unfiltered value used by ATE. Ranges from -10…+1500 depending on mode
NixusUI1_Raw	59	Real	RA	R	Raw value for UI2	-	Mode dependent	Unfiltered value used by ATE. Ranges from -10…+1500 depending on mode
NixusPSA_Raw	62	Real	RA	R	Raw value for pressure sensor A	-	0…32767	Unfiltered unitless pressure value
NixusPSB_Raw	65	Real	RA	R	Raw value for pressure sensor B	-	0…32767	Unfiltered unitless pressure value
NixusPSA_Offset	68	Real	EE	R/W	User offset calibration value PSA	0	< 0	Always negative when valid
NixusPSB_Offset	71	Real	EE	R/W	User offset calibration value PSB	0	< 0	Always negative when valid

Table 19