TA-Smart Modbus RTU
Protocol Implementation
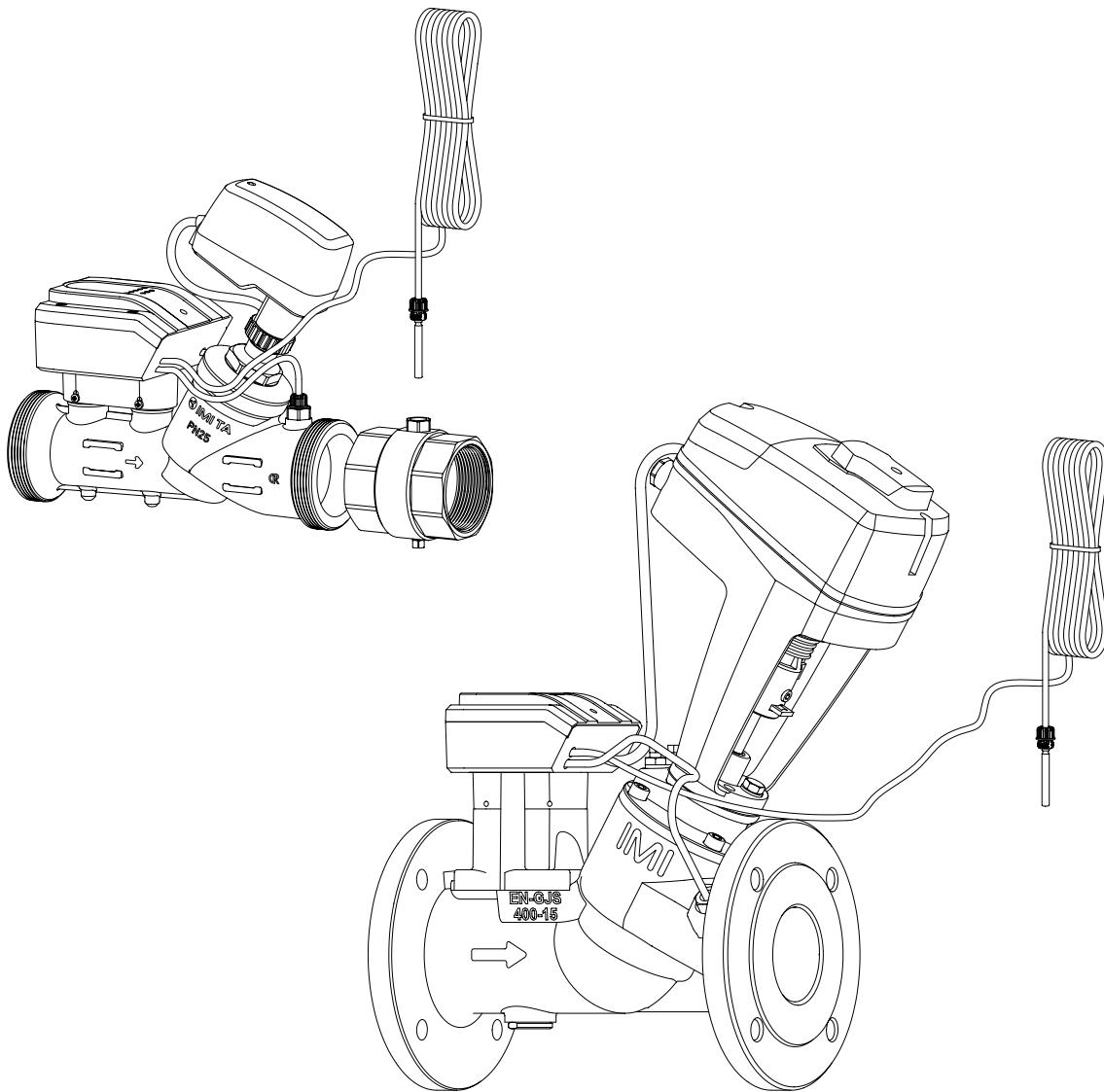
General information

Date:	21/08/2023
Protocol:	Modbus RTU
Product Name:	TA-Smart/TA-Smart-Dp DN 20 to 125
Product Model Number:	322231-XXXXX, 322232-XXXXX
Product Description:	Digitally configurable connected 2-way control valve with integrated ultrasonic flow measurement (with remote differential pressure sensor in option)
Firmware Revision (Modbus RTU):	8.0.0
Address:	1* to 247
Baud rates:	AutoDetect, 1200, 2400, 4800, 9600* 19200, 38400, 56200, 76800, 115200
Parity:	Odd, Even*, None
Databits:	8
Stopbit:	1
Endianness (float):	Big-endian

*) Default value

For ease of TA-Smart commissioning, frequently used registers have been grouped into reading blocks of similar data types. However, these blocks may not cover all possible field applications. To access a more comprehensive list of registers, please refer to the relevant section in the documentation.

Writing Register - Control

Address	Comment	Register	Data type	Access	Unit	Value range	Default	Description
30-303		RelativeSetpoint	Float	R/W	%	[0.0, 100.0]	100.0	Relative setpoint in percentage of currently applicable max value. This setpoint applies if register ControlSource is set to Bus.

Please be aware that the following blocks are in read-only mode, meaning that they cannot be modified or edited.

Reading block Measured parameters - Float - Live changing

Register	Comment	Default register	Data type	Access	Unit	Value range	Default	Description
1050-1051		MeasuredFlow_unit1	Float	R	FlowUnit1	[0.0, 3.4e+38]	n.a.	Measured flow
1052-1053		MeasuredSupplyTemp_degC	Float	R	°C	[-40.0, 140.0]	n.a.	Measured supply temperature
1054-1055		MeasuredReturnTemp_degC	Float	R	°C	[-40.0, 140.0]	n.a.	Measured return temperature
1056-1057		MeasuredDeltaT_K	Float	R	K	[0.0, 3.4e+38]	n.a.	Measured Delta T
1058-1059		RelativeMeasuredPosition	Float	R	%	[0.0, 100.0]	n.a.	Measured position expressed in percentage of the currently applicable maximum position depending on register CurrentRegime
1060-1061		MeasuredPower_unit1	Float	R	PowerUnit1	[0.0, 3.4e+38]	n.a.	Measured power
1062-1063		EnergyCounterRegime1_unit1	Float	R	EnergyUnit1	[0.0, 3.4e+38]	n.a.	Energy counter in regime 1
1064-1065	Only for Change-Over	EnergyCounterRegime2_unit1	Float	R	EnergyUnit1	[0.0, 3.4e+38]	n.a.	Energy counter in regime 2

Reading block Configuration - Word

Register	Comment	Default register	Data type	Access	Unit	Value range	Default	Description
1000		ValveSize	Word	R	n.a.	3: DN20 - 3/4" 4: DN25 - 1" 5: DN32 - 1"1/4 6: DN40 - 1"1/2 7: DN50 - 2" 8: DN65 - 2"1/2 9: DN80 - 3" 10: DN100 - 4" 11: DN125 - 5"	n.a.	Size of the valve
1001		ControlMode	Word	R	n.a.	1: Flow control 2: Power control 3: Dp control 4: Position control	1	The control mode indicates which variable is being controlled by the valve
1002		ControlSource	Word	R	n.a.	0: Analog 1: Bus	0	Control source specifies whether the setpoint for controlling the valve is provided by the analog input (in which case bus is used just for monitoring) or by the bus
1003		OverrideType	Word	R	n.a.	0: None 1: Flow 2: Power 3: Dp[1] 4: Valve position 5: Stop 6: Simulated operation	0	Type of override defining which action is taken as an override to the configured control. The valve resets automatically to normal operation leaving the override after 3 hours.
1004	Only for Temperature limitation	TemperatureLimitationType[2]	Word	R	n.a.	0: None 1: DT limitation 2: T return limitation	0	Temperature limitation type to be chosen between DT or return temperature. It applies on top of the currently operating control mode provided that the flow is above a defined threshold.
1005		TemperatureLimitationStatus[2]	Word	R	n.a.	0: Inactive 1: Active	0	Current status of the temperature limitation. There are conditions under which an enabled temp limitation is inactive (e.g. when the setpoint of the control source is below the temperature limitation target)
1006	Only for Change-Over	CurrentRegime	Word	R	n.a.	0: Regime1 1: Regime2 2: Regime1Setback 3: Regime2Setback	0	Current change-over regime. Changing the current change-over regime via Modbus can be done only if register RegimeSwitching is set to 2.

1) These registers are only available when using a TA-Smart-Dp (322232-XXXXX).
2) These registers are not available when using a TA-Smart Dp (322232-XXXXX).

Reading block Configuration - Word

Register	Comment	Default register	Data type	Access	Unit	Value range	Default	Description
1100-1101		MaxFlowRegime1_unit1	Float	R	FlowUnit1	[ValveMinAdjustableFlow_unit1, ValveNominalFlow_unit1]	ValveNominalFlow_unit1	Max flow assigned to the valve when the valve is in regime 1
1102-1103		MinFlowRegime1_unit1	Float	R	FlowUnit1	[0.0, MaxFlowRegime1_unit1]	0.0	Min flow assigned to the valve when the valve is in regime 1
1104-1105	Only for Temperature limitation	MinFlowThresholdRegime1_unit1[2]	Float	R	FlowUnit1	[0.05*ValveNominalFlow_unit1, 0.9*MaxFlowRegime1_unit1]	0.25*MaxFlowRegime1_unit1	Flow threshold under which temperature limitation ceases to operate in regime 1
1106-1107		DeltaTSetpointRegime1_degK[2]	Float	R	K	[1.0, 50.0]	6.0	Delta temperature setpoint assigned to the valve when the valve is in regime 1
1108-1109		TReturnSetpointRegime1_degC[2]	Float	R	°C	[-9.0, 119.0]	12.0	Return temperature setpoint assigned to the valve when the valve is in regime 1
1110-1111	Only for Change-Over	MaxFlowRegime2_unit1	Float	R	FlowUnit1	[ValveMinAdjustableFlow_unit1, ValveNominalFlow_unit1]	ValveNominalFlow_unit1	Max flow assigned to the valve when the valve is in regime 2
1112-1113		MinFlowRegime2_unit1	Float	R	FlowUnit1	[0.0, MaxFlowRegime2_unit1]	0.0	Min flow assigned to the valve when the valve is in regime 2
1114-1115	Only for Change-Over and Temperature limitation	MinFlowThresholdRegime2_unit1[2]	Float	R	FlowUnit1	[0.05*ValveNominalFlow_unit1, 0.9*MaxFlowRegime2_unit1]	0.25*MaxFlowRegime2_unit1	Flow threshold under which temperature limitation ceases to operate in regime 2
1116-1117		DeltaTSetpointRegime2_degK[2]	Float	R	K	[1.0, 50.0]	6.0	Delta temperature setpoint assigned to the valve when the valve is in regime 2
1118-1119		TReturnSetpointRegime2_degC[2]	Float	R	°C	[-9.0, 119.0]	12.0	Return temperature setpoint assigned to the valve when the valve is in regime 2

1) These registers are only available when using a TA-Smart-Dp (322232-XXXXX).
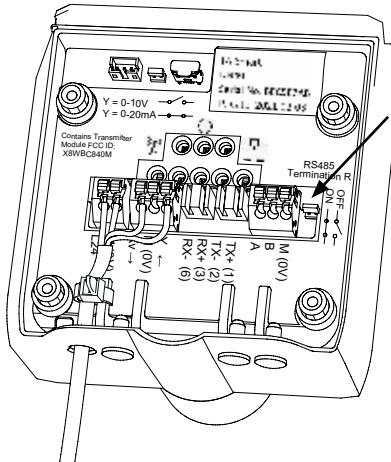2) These registers are not available when using a TA-Smart Dp (322232-XXXXX).

The exhaustive list of registers can be found on the next pages.

Event table

Value	Description
0x40000001	EventResetToUserDefault
0x40000002	EventLoginAsAdmin

RS-485 termination resistance

The jumper placed beside the RS-485 A, B and M wire connectors must be closed for activating the 120Ohm RS-485 termination resistance. The termination resistance must be activated if TA-Smart is at the end of a daisy chain or if it is not part of a daisy chain.

Modbus registers (pages 4-6)

Register	Address	Type	Access	Unit	Value range	Default	Description
ValveFamily	0	Word	R	n.a.	1: TA-Smart 2: TA-Smart-Dp	n.a.	Family to which the valve belongs
ValveVersion	1	Word	R	n.a.	1: Standard	n.a.	Version of the valve
ValveSize	2	Word	R	n.a.	3: DN20 - 3/4" 4: DN25 - 1" 5: DN32 - 1"1/4 6: DN40 - 1"1/2 7: DN50 - 2" 8: DN65 - 2"1/2 9: DN80 - 3" 10: DN100 - 4" 11: DN125 - 5"	n.a.	Size of the valve
ValveNominalFlow_unit1	3-4	Float	R	FlowUnit1	[0.0, 3.4e+38]	n.a.	Nominal flow of the valve expressed in the units selected in registers FlowUnit1 and FlowUnit2 respectively. This is the maximum value of flow that can be assigned to the valve.
ValveNominalFlow_unit2	5-6	Float	R	FlowUnit2	[0.0, 3.4e+38]	n.a.	
ValveMinAdjustableFlow_unit1	7-8	Float	R	FlowUnit1	[0.0, 3.4e+38]	n.a.	Min adjustable flow of the valve expressed in the units selected in registers FlowUnit1 and FlowUnit2 respectively. This is the minimum value of flow that can be assigned to the valve.
ValveMinAdjustableFlow_unit2	9-10	Float	R	FlowUnit2	[0.0, 3.4e+38]	n.a.	
ValveNominalPower_unit1	11-12	Float	R	PowerUnit1	[0.0, 3.4e+38]	n.a.	Nominal power of the valve expressed in the units selected in registers PowerUnit1 and PowerUnit2 respectively. This is the maximum value of power that can be assigned to the valve.
ValveNominalPower_unit2	13-14	Float	R	PowerUnit2	[0.0, 3.4e+38]	n.a.	
ValveMinAdjustablePower_unit1	15-16	Float	R	PowerUnit1	[0.0, 3.4e+38]	n.a.	Min adjustable power of the valve expressed in the units selected in registers PowerUnit1 and PowerUnit2 respectively. This is the minimum value of power that can be assigned to the valve.
ValveMinAdjustablePower_unit2	17-18	Float	R	PowerUnit2	[0.0, 3.4e+38]	n.a.	
ValveNominalStroke_mm	19-20	Float	R	mm	[0.0, 3.4e+38]	n.a.	Nominal stroke of the valve expressed in millimeters and inches respectively.
ValveNominalStroke_inch	21-22	Float	R	inch	[0.0, 3.4e+38]	n.a.	
ValveMinAdjustableStroke_mm	23-24	Float	R	mm	[0.0, 3.4e+38]	n.a.	Min adjustable stroke of the valve expressed in millimeters and inches respectively. This is the minimum value of limited stroke that can be assigned to the valve.
ValveMinAdjustableStroke_inch	25-26	Float	R	inch	[0.0, 3.4e+38]	n.a.	
MaxAdjustableDpStab_unit1[1]	27-28	Float	R	DpUnit 1	[0.0, 3.4e+38]	n.a.	Max adjustable stabilised Dp expressed in the units selected in registers DpUnit1 and DpUnit2 respectively. This is the maximum value of stabilised differential pressure that can be assigned to the valve given the Dp sensor that is connected to it.
MaxAdjustableDpStab_unit2[1]	29-30	Float	R	DpUnit 2	[0.0, 3.4e+38]	n.a.	
MinAdjustableDpStab_unit1[1]	31-32	Float	R	DpUnit 1	[0.0, 3.4e+38]	n.a.	Min adjustable stabilised Dp expressed in the units selected in registers DpUnit1 and DpUnit2 respectively. This is the minimum value of stabilised differential pressure that can be assigned to the valve given the Dp sensor that is connected to it.
MinAdjustableDpStab_unit2[1]	33-34	Float	R	DpUnit 2	[0.0, 3.4e+38]	n.a.	
ValveIdentifier	100-101	4 bytes	R	n.a.	n.a.	n.a.	Valve identifier, the hexadecimal representation of this variable is a reference that can be seen on the PCBA and in the Bluetooth advertisement of the valve.
ValveUserID	102-117	String	R/W	n.a.	n.a.	n.a.	Editable alphanumeric chain (32 chars) that can be used to label the valve
FirmwareVersion	118-119	4 bytes	R	n.a.	n.a.	n.a.	Installed version of the firmware a.b.c.d where: (a) High byte of register 118 is the BT840 firmware compatibility number (b) Low byte of register 118 is the App compatibility number (c) High byte of register 119 is the major version number of the firmware (d) Low byte of register 119 is the minor version number of the firmware
FluidType	120	Word	R/W	n.a.	0: Water 1: Monoethylene glycol 2: Monopropylene glycol	0	Type of the fluid. It can be either water or one of the listed additives diluted in water
FlowSide	121	Word	R/W	n.a.	0: Supply side 1: Return side	0	Piping side on which the valve is installed (supply or return)
ControlMode	122	Word	R/W	n.a.	1: Flow control 2: Power control 3: Dp control[1] 4: Position control	1	The control mode indicates which variable is being controlled by the valve
ControlCharacteristics	123	Word	R/W	n.a.	0: Linear 1: Equal-percentage (EQM) 2: Inverted EQM	1	Signal characteristics applied to the setpoint value given in register RelativeSetpoint into a target value for the controlled variable. When control mode is set to flow control, the chosen characteristics should be selected as EQM and Linear in the other cases.
ControlCharCoefficient	124-125	Float	R/W	n.a.	[0.01, 0.99]	0.25	This coefficient (thermal efficiency) allows to adjust the curvature of the EQM and Inverted EQM characteristics. Default value is 0.25.
ControlSource	126	Word	R/W	n.a.	0: Analog 1: Bus	0	Control source specifies whether the setpoint for controlling the valve is provided by the analog input (in which case bus is used just for monitoring) or by the bus
AnalogSignalType	127	Word	R	n.a.	0: Voltage (VDC) 1: Current (mA)	0	Defines the type of analog input signal as set by jumper inside the SmartBox
FlowUnit1	128	Word	R/W	n.a.	0: m3/h 1: l/s 2: l/min 3: l/h 4: GPM	0	First selected flow unit
FlowUnit2	129	Word	R/W	n.a.	0: m3/h 1: l/s 2: l/min 3: l/h 4: GPM	4	Second selected flow unit
PowerUnit1	130	Word	R/W	n.a.	0: kW 1: W 2: Btu/h 3: kBtu/h 4: ton (refrig.)	0	First selected power unit
PowerUnit2	131	Word	R/W	n.a.	0: kW 1: W 2: Btu/h 3: kBtu/h 4: ton (refrig.)	3	Second selected power unit
EnergyUnit1	132	Word	R/W	n.a.	0: kWh 1: kJ 2: MJ 3: kBtu 4: MBtu 5: ton.h	0	First selected energy unit
EnergyUnit2	133	Word	R/W	n.a.	0: kWh 1: kJ 2: MJ 3: kBtu 4: MBtu 5: ton.h	4	Second selected energy unit

Name	Register	Type	R/W	Unit	Range	Default	Description
DpUnit1[1)]	134	Word	R/W	n.a.	0: kPa 1: bar 2: psi	1	First selected differential pressure unit
DpUnit2[1)]	135	Word	R/W	n.a.	0: kPa 1: bar 2: psi	4	Second selected differential pressure unit
CyclicControlTimeout[3)]	136	Word	R/W	n.a.	0: Disabled 1: Enabled	0	Raise an error if no control signal is sent before Time out
CyclicControlTimeoutDelay[3)]	137	Word	R/W	n.a.	[0, 120]	n.a.	Delay after which an error is raised. The CyclicControlTimeout should be enabled (136)
RegimeSwitching	200	Word	R	n.a.	0: None 1: Dual-range input signal 2: Bus 3: Temperature detection 4: Scheduling	0	Switching mode between regimes 1 and 2. To be changed by configuration with the HyTune app. When None, values input for regime 1 are used.
CurrentRegime	201	Word	R/W	n.a.	0: Regime1 1: Regime2 2: Regime1Setback 3: Regime2Setback	0	Current change-over regime. Changing the current change-over regime via Modbus can be done only if register RegimeSwitching is set to 2
R1SetbackPercentage	202-203	Float	R/W	%	[0.0, 100.0]	80.0	Setback percentage applied to MaxFlowRegime1 when CurrentRegime is set to Regime1Setback
R2SetbackPercentage	204-205	Float	R/W	%	[0.0, 100.0]	80.0	Setback percentage applied to MaxFlowRegime2 when CurrentRegime is set to Regime2Setback
MaxFlowRegime1_unit1	206-207	Float	R/W	FlowUnit1	[ValveMinAdjustableFlow_unit1, ValveNominalFlow_unit1]	ValveNominalFlow unit1	Max flow assigned to the valve when the valve is in regime 1
MaxFlowRegime1_unit2	208-209	Float	R/W	FlowUnit2	[ValveMinAdjustableFlow_unit2, ValveNominalFlow_unit2]	ValveNominalFlow unit2	
MaxFlowRegime2_unit1	210-211	Float	R/W	FlowUnit1	[ValveMinAdjustableFlow_unit1, ValveNominalFlow_unit1]	ValveNominalFlow unit1	Max flow assigned to the valve when the valve is in regime 2
MaxFlowRegime2_unit2	212-213	Float	R/W	FlowUnit2	[ValveMinAdjustableFlow_unit2, ValveNominalFlow_unit2]	ValveNominalFlow unit2	
MinFlowRegime1_unit1	214-215	Float	R/W	FlowUnit1	[0.0, MaxFlowRegime1_unit1]	0.0	Min flow assigned to the valve when the valve is in regime 1
MinFlowRegime1_unit2	216-217	Float	R/W	FlowUnit2	[0.0, MaxFlowRegime1_unit2]	0.0	
MinFlowRegime2_unit1	218-219	Float	R/W	FlowUnit1	[0.0, MaxFlowRegime2_unit1]	0.0	Min flow assigned to the valve when the valve is in regime 2
MinFlowRegime2_unit2	220-221	Float	R/W	FlowUnit2	[0.0, MaxFlowRegime2_unit2]	0.0	
MaxPowerRegime1_unit1	222-223	Float	R/W	PowerUnit1	[ValveMinAdjustablePower_unit1, ValveNominalPower_unit1]	ValveNominalPower unit1	Max power assigned to the valve when the valve is in regime 1
MaxPowerRegime1_unit2	224-225	Float	R/W	PowerUnit2	[ValveMinAdjustablePower_unit2, ValveNominalPower_unit2]	ValveNominalPower unit2	
MaxPowerRegime2_unit1	226-227	Float	R/W	PowerUnit1	[ValveMinAdjustablePower_unit1, ValveNominalPower_unit1]	ValveNominalPower unit1	Max power assigned to the valve when the valve is in regime 2
MaxPowerRegime2_unit2	228-229	Float	R/W	PowerUnit2	[ValveMinAdjustablePower_unit2, ValveNominalPower_unit2]	ValveNominalPower unit2	
MaxPositionRegime1_mm	230-231	Float	R/W	mm	[ValveMinAdjustableStroke_mm, ValveNominalStroke_mm]	ValveNominalStroke mm	Max position assigned to the valve when the valve is in regime 1
MaxPositionRegime1_inch	232-233	Float	R/W	inch	[ValveMinAdjustableStroke_inch, ValveNominalStroke_inch]	ValveNominalStroke inch	
MaxPositionRegime2_mm	234-235	Float	R/W	mm	[ValveMinAdjustableStroke_mm, ValveNominalStroke_mm]	ValveNominalStroke mm	Max position assigned to the valve when the valve is in regime 2
MaxPositionRegime2_inch	236-237	Float	R/W	inch	[ValveMinAdjustableStroke_inch, ValveNominalStroke_inch]	ValveNominalStroke inch	
MinPositionRegime1_mm	238-239	Float	R/W	mm	[0.0, MaxPositionRegime1_mm]	0.0	Min position assigned to the valve when the valve is in regime 1
MinPositionRegime1_inch	240-241	Float	R/W	inch	[0.0, MaxPositionRegime1_inch]	0.0	
MinPositionRegime2_mm	242-243	Float	R/W	mm	[0.0, MaxPositionRegime2_mm]	0.0	Min position assigned to the valve when the valve is in regime 2
MinPositionRegime2_inch	244-245	Float	R/W	inch	[0.0, MaxPositionRegime2_inch]	0.0	
TemperatureLimitationType[2)]	246	Word	R/W	n.a.	0: None 1: DT limitation 2: T return limitation	0	Temperature limitation type to be chosen between DT or return temperature. It applies on top of the currently operating control mode provided that the flow is above a defined threshold.
TemperatureLimitationStatus[2)]	247	Word	R	n.a.	0: Inactive 1: Active	0	Current status of the temperature limitation. There are conditions under which an enabled temp limitation is inactive (e.g. when the setpoint of the control source is below the temperature limitation target)
MinFlowThresholdRegime1_unit1[2)]	248-249	Float	R/W	FlowUnit1	[0.05*ValveNominalFlow_unit1, 0.9*MaxFlowRegime1_unit1]	0.25*MaxFlowRegime1_unit1	Flow threshold under which temperature limitation ceases to operate in regime 1
MinFlowThresholdRegime1_unit2[2)]	250-251	Float	R/W	FlowUnit2	[0.05*ValveNominalFlow_unit2, 0.9*MaxFlowRegime1_unit2]	0.25*MaxFlowRegime1_unit2	Flow threshold under which temperature limitation ceases to operate in regime 1
MinFlowThresholdRegime2_unit1[2)]	252-253	Float	R/W	FlowUnit1	[0.05*ValveNominalFlow_unit1, 0.9*MaxFlowRegime2_unit1]	0.25*MaxFlowRegime2_unit1	Flow threshold under which temperature limitation ceases to operate in regime 2
MinFlowThresholdRegime2_unit2[2)]	254-255	Float	R/W	FlowUnit2	[0.05*ValveNominalFlow_unit2, 0.9*MaxFlowRegime2_unit2]	0.25*MaxFlowRegime2_unit2	Flow threshold under which temperature limitation ceases to operate in regime 2
AnalogSetPointValue	300-301	Float	R	VDC or mA	[0.0, 10.0] for VDC; [0.0, 20.0] for mA	n.a.	Analog input value in VDC or mA used as setpoint for controlling the valve if register ControlSource is set to Analog. Value is VDC or mA depending on register AnalogSignalType
RelativeSetpoint	302-303	Float	R/W	%	[0.0, 100.0]	100.0	Relative setpoint in percentage of currently applicable max value. This setpoint applies if register ControlSource is set to Bus
FlowSetPoint_unit1	304-305	Float	R	FlowUnit1	[0.0, ValveNominalFlow_unit1]	n.a.	Flow setpoint
FlowSetPoint_unit2	306-307	Float	R	FlowUnit2	[0.0, ValveNominalFlow_unit2]	n.a.	
PowerSetPoint_unit1	308-309	Float	R	PowerUnit1	[0.0, ValveNominalPower_unit1]	n.a.	Power setpoint
PowerSetPoint_unit2	310-311	Float	R	PowerUnit2	[0.0, ValveNominalPower_unit2]	n.a.	
PositionSetPoint_mm	312-313	Float	R	mm	[0.0, ValveNominalStroke_mm]	n.a.	Position setpoint
PositionSetPoint_inch	314-315	Float	R	inch	[0.0, ValveNominalStroke_inch]	n.a.	
RelativeMeasuredFlow	316-317	Float	R	%	[0.0, 100.0]	n.a.	Measured flow expressed in percentage of the currently applicable maximum flow depending on register CurrentRegime
MeasuredFlow_unit1	318-319	Float	R	FlowUnit1	[0.0, 3.4e+38]	n.a.	Measured flow
MeasuredFlow_unit2	320-321	Float	R	FlowUnit2	[0.0, 3.4e+38]	n.a.	
MeasuredSupplyTemp_degC	322-323	Float	R	°C	[-40.0, 140.0]	n.a.	Measured supply temperature
MeasuredSupplyTemp_degF	324-325	Float	R	°F	[-40.0, 284.0]	n.a.	
MeasuredReturnTemp_degC	326-327	Float	R	°C	[-40.0, 140.0]	n.a.	Measured return temperature
MeasuredReturnTemp_degF	328-329	Float	R	°F	[-40.0, 284.0]	n.a.	
MeasuredDeltaT_K	330-331	Float	R	K	[0.0, 3.4e+38]	n.a.	Measured Delta T
MeasuredDeltaT_degF	332-333	Float	R	°F	[0.0, 3.4e+38]	n.a.	
RelativeMeasuredPower	334-335	Float	R	%	[0.0, 100.0]	n.a.	Measured power expressed in percentage of the currently applicable maximum power depending on register CurrentRegime
MeasuredPower_unit1	336-337	Float	R	PowerUnit1	[0.0, 3.4e+38]	n.a.	Measured power
MeasuredPower_unit2	338-339	Float	R	PowerUnit2	[0.0, 3.4e+38]	n.a.	
EnergyCounterRegime1_unit1	340-341	Float	R	EnergyUnit1	[0.0, 3.4e+38]	n.a.	Energy counter in regime 1
EnergyCounterRegime1_unit2	342-343	Float	R	EnergyUnit2	[0.0, 3.4e+38]	n.a.	
EnergyCounterRegime2_unit1	344-345	Float	R	EnergyUnit1	[0.0, 3.4e+38]	n.a.	Energy counter in regime 2
EnergyCounterRegime2_unit2	346-347	Float	R	EnergyUnit2	[0.0, 3.4e+38]	n.a.	

Name	Register	Type	R/W	Unit	Range	Default	Description
RelativeMeasuredPosition	348-349	Float	R	%	[0.0, 100.0]	n.a.	Measured position expressed in percentage of the currently applicable maximum position depending on register CurrentRegime
MeasuredPosition_mm	350-351	Float	R	mm	[0.0, 3.4e+38]	n.a.	Measured position
MeasuredPosition_inch	352-353	Float	R	inch	[0.0, 3.4e+38]	n.a.	
AdditiveConcentration	354-355	Float	R/W	%	[0.0, 57.0]	0.0	Additive concentration in water in % weight. Additive is defined through register FluidType. Register is not writable if FluidType is Water
DeltaTSetpointRegime1_degK[2]	356-357	Float	R/W	K	[1.0, 50.0]	6.0	Delta temperature setpoint assigned to the valve when the valve is in regime 1
DeltaTSetpointRegime1_degF[2]	358-359	Float	R/W	°F	[1.8, 90.0]	10.8	
DeltaTSetpointRegime2_degK[2]	360-361	Float	R/W	K	[1.0, 50.0]	6.0	Delta temperature setpoint assigned to the valve when the valve is in regime 2
DeltaTSetpointRegime2_degF[2]	362-363	Float	R/W	°F	[1.8, 90.0]	10.8	
TReturnSetpointRegime1_degC[2]	364-365	Float	R/W	°C	[-9.0, 119.0]	12.0	Return temperature setpoint assigned to the valve when the valve is in regime 1
TReturnSetpointRegime1_degF[2]	366-367	Float	R/W	°F	[15.8, 246.2]	53.6	
TReturnSetpointRegime2_degC[2]	368-369	Float	R/W	°C	[-9.0, 119.0]	12.0	Return temperature setpoint assigned to the valve when the valve is in regime 2
TReturnSetpointRegime2_degF[2]	370-371	Float	R/W	°F	[15.8, 246.2]	53.6	
DpStabSetpointRegime1_unit1[1]	372-373	Float	R/W	DpUnit1	[MinAdjustableDpStab_unit1, MaxAdjustableDpStab_unit1]	MinAdjustableDpStab_unit1	Stabilised differential pressure setpoint assigned to the valve when the valve is in regime 1
DpStabSetpointRegime1_unit2[1]	374-375	Float	R/W	DpUnit2	[MinAdjustableDpStab_unit2, MaxAdjustableDpStab_unit2]	MinAdjustableDpStab_unit2	
DpStabSetpointRegime2_unit1[1]	376-377	Float	R/W	DpUnit1	[MinAdjustableDpStab_unit1, MaxAdjustableDpStab_unit1]	MinAdjustableDpStab_unit1	Stabilised differential pressure setpoint assigned to the valve when the valve is in regime 2
DpStabSetpointRegime2_unit2[1]	378-379	Float	R/W	DpUnit2	[MinAdjustableDpStab_unit2, MaxAdjustableDpStab_unit2]	MinAdjustableDpStab_unit2	
MeasuredDpStab_unit1[1]	380-381	Float	R	DpUnit1	[0.0, 3.4e+38]	n.a.	Stabilised differential pressure measured by Dp sensor
MeasuredDpStab_unit2[1]	382-383	Float	R	DpUnit2	[0.0, 3.4e+38]	n.a.	
OverrideType	400	Word	R/W	n.a.	0: None 1: Flow 2: Power 3: Dp[1] 4: Valve position 5: Stop 6: Simulated operation	0	Type of override defining which action is taken as an override to the configured control. The valve resets automatically to normal operation leaving the override after 3 hours.
OverrideValue_unit1	401-402	Float	R/W	n.a.	[0.0, 3.4e+38]	n.a.	Value of the max flow, power or position that applies if register OverrideType is set to 1, 2, 4 or 6. The value is expressed according in selected Unit1 for flow and power and in mm for position
OverrideValue_unit2	403-404	Float	R/W	n.a.	[0.0, 3.4e+38]	n.a.	Value of the max flow, power or position that applies if register OverrideType is set to 1, 2, 4 or 6. The value is expressed according in selected Unit2 for flow and power and in inch for position
CurrentErrorState	500-501	Long	R	n.a.	Bit 0 (0x01): 0/1	0	Error 1: ErrorLowPower
					Bit 1 (0x02): 0/1	0	Error 2: ErrorInputLineBroken
					Bit 2 (0x04): 0/1	0	Error 3: WarningFlowNotReached
					Bit 3 (0x08): 0/1	0	Error 4: WarningPowerNotReached
					Bit 4 (0x10): 0/1	0	Error 5: ErrorLocalTempSensorDisconnected
					Bit 5 (0x20): 0/1	0	Error 6: ErrorRemoteTempSensorDisconnected
					Bit 6 (0x40): 0/1	0	Error 7: ErrorLocalTempSensorShortCircuit
					Bit 7 (0x80): 0/1	0	Error 8: ErrorRemoteTempSensorShortCircuit
					Bit 8 (0x100): 0/1	0	Error 9: ErrorLocalTempSensorBelowMin
					Bit 9 (0x200): 0/1	0	Error 10: ErrorRemoteTempSensorBelowMin
					Bit 10 (0x400): 0/1	0	Error 11: ErrorLocalTempSensorAboveMax
					Bit 11 (0x800): 0/1	0	Error 12: ErrorRemoteTempSensorAboveMax
					Bit 12 (0x1000): 0/1	0	Error 13: WarningActuatorManualOverride
					Bit 13 (0x2000): 0/1	0	Error 14: ErrorActuatorBlocked
					Bit 14 (0x4000): 0/1	0	Error 15: ErrorFlowMeasurement
					Bit 16 (0x10000): 0/1	0	Error 17: Reverse Flow Detected
					Bit 17 (0x20000): 0/1	0	Error 18: ErrorActuatorComFailure
					Bit 18 (0x40000): 0/1	0	Error 19: ErrorDpSensorDisconnected
					Bit 19 (0x80000): 0/1	0	Error 20: WarningAvailDpTooLowForDpStab
					Bit 20 (0x100000): 0/1	0	Error 21: WarningResistLoadTooLowForDpStab
					Bit 21 (0x200000): 0/1	0	Error 22: WarningDpStabAboveMax
					Bit 22 (0x400000): 0/1	0	Error 23: ErrorBusCyclicControlTimeout
					Bit 23 (0x800000): 0/1	0	Error 24: WarningHighFlow
LastErrors[1]	502-503	Long	R	n.a.	[0, 2^32]	0	UTC time in seconds since 1st January 2000 00:00 epoch
	504-505	4 bytes	R	n.a.		0	First of the last ten errors, see register CurrentErrorState above. Error is cleared if bit 31 is set to 1 (0x80000000)
	506-507	Float	R	n.a.	[0.0, 3.4e+38]	0	Value if a data exists for the error
…							
LastErrors[10]	556-557	Long	R	n.a.	[0, 2^32]	0	UTC time in seconds since 1st January 2000 00:00 epoch
	558-559	4 bytes	R	n.a.		0	Last of the last ten errors, see register CurrentErrorState above. Error is cleared if bit 31 is set to 1 (0x80000000)
	560-561	Float	R	n.a.	[0.0, 3.4e+38]	0	Value if a data exists for the error
LastEvents[1]	562-563	Long	R	n.a.	[0, 2^32]	0	UTC time in seconds since 1st January 2000 00:00 epoch
	564-565	4 bytes	R	n.a.		0	First of the last ten events, see table Events
	566-567	Float	R	n.a.	[0.0, 3.4e+38]	0	Value if a data exists for the event
…							
LastEvents[10]	616-617	Long	R	n.a.	[0, 2^32]	0	UTC time in seconds since 1st January 2000 00:00 epoch
	618-619	4 bytes	R	n.a.		0	Last of the last ten events, see table Events
	620-621	Float	R	n.a.	[0.0, 3.4e+38]	0	Value if a data exists for the event

1) These registers are only available when using a TA-Smart-Dp (322232-XXXXX).
2) These registers are not available when using a TA-Smart Dp (322232-XXXXX).
3) These registers are only available from FW 8.0.0.