ABB MEASUREMENT & ANALYTICS | 2108522MNAA

Modbus® Registers

266JST/267 Modbus® Multivariable Transmitter

Contents

1 Introduction

This document contains the register maps supported by the ABB 266JST and 267 Modbus Multivariable transmitters.

The 266JST register map is an extension of the register map for the 267 and therefore supports additional configuration options. The 266JST can be configured for any one of the following register maps depending on field requirements:

- ABB Registers: Native registers for the 266JST.
- Emulation Registers: Used when the 266JST emulates a third-party transmitter:
  - Rosemount™ Emulation Registers: The 266JST emulates the Rosemount 3095FB transmitter.
  - Invensys Emulation Registers: The 266JST emulates the Invensys IMV25 transmitter.

2 Implementation

All registers in this document are referenced to base one. The MODBUS® message frame for read and write access is base zero. This means that the number of the mapped register is one higher than the number that is sent in a MODBUS® message frame.

Function code 4 is meant to access the process parameters, which possibly could be polled in a low cycle time (> 100 ms). Therefore, the data of the parameters is held in an internal buffer, which has a low access time. Function code 3 should be used to access parameters that are non-cyclic or with a high cycle time (> seconds).

By reading or writing 32 bit or 16 bit registers, 4 or 2 bytes are transmitted. If a parameter has a data type which uses fewer bytes than that, the data is transmitted in the lower data bytes of the MODBUS® message frame. The data bytes that are not used are set to zero.

Table 2-1: Modbus category of register address ranges

Category	266	267	16-bit	32-bit
Information registers	√		1-20	5001-5040
Normal Operation Polling registers	√	√	21-218	401-1018
Customer Diagnostic Limits	√		5541-5548	5041-5056
Customer Max / Min Values	√		5549-5556	5057-5072
Service Max value ever measured	√		5557-5564	5073-5088
Customer Operating Range Alarm Levels	√		5565-5574	5089-5108
Measurements Bias Parameters	√		5575-5580	5109-5118
Informative / Maintenance	√		64001-64002	64001-64003

Table 2-2: Data types

Name	Size	Description
Float32	32-bit	Floating Point IEEE. floating point, r is high word, (r+1) is low word
U32	32-bit	Unsigned Integer
U16	16-bit	Unsigned Integer
U8	8-bit	Unsigned Integer, **Note:** upper 8 bits are zero filled in a 16-bit register
Char	8-bit	Character – ASCII, see individual register for total size, 2 characters fit in a 16-bit register

3 ABB registers

IMPORTANT NOTE: The register map in Table 3-1 is an expanded map from the ABB 267 MODBUS® transmitter. In the Added Ext. column, checked is for the 266 only, unchecked applies to the 266 and 267.

Table 3-1: ABB Multivariable register map

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	16 bit				
Information Registers					
1 – 8	5001 – 5016	Char	Transducer ID / Serial number 16 ASCII characters string. Ex. "T090100001"	RO	√
9	5017 – 5018	U32	Date Factory Characterized seconds since 1970 Jan 1st	RO	√
10	5019 – 5020	U32	Communication Board Hardware example value 0x00010203 represents 1.2.3 bits 23-16 = Major Revision (compatibility change) bits 15-8 = Minor Revision (functionality or operation) bits 7-0 = Sub-minor Revision (bug fixes)	RO	√
11	5021 – 5022	U32	Sensor Board Hardware base part number 3 MSB version number 1LSB see register 10 for more information	RO	√
12	5023 – 5024	U32	Communication Board firmware base part number 3 MSB version number 1LSB see register 10 for more information	RO	√
13	5025 – 5026	U32	Sensor Board firmware base part number 3 MSB version number 1LSB see register 10 for more information	RO	√
14	5027 – 5028	Float32	DP Upper Range Limit (Set by Measurement Sensor URL)	RO	√
15	5029 – 5030	Float32	DP Lower Range Limit (Set by Measurement Sensor LRL)	RO	√
16	5031 – 5032	Float32	SP Upper Range Limit (Set by Measurement Sensor URL)	RO	√
17	5033 – 5034	Float32	SP Lower Range Limit (Set by Measurement Sensor LRL)	RO	√
18	5035 – 5036	Float32	Transducer cell Temperature Upper Range Limit (URL)	RO	√
19	5037 – 5038	Float32	Transducer cell Temperature Lower Range Limit (LRL)	RO	√
20	5039 – 5040	Float32	Seconds since last Restart	RO	√
			Normal Operation Polling registers		
21	401 – 402	Float32	Differential Pressure (Damping, Calibration and Units applied)	RO	
22	403 – 404	Float32	Static Pressure (Damping, Calibration and Units applied)	RO	
23	405 – 406	Float32	Process Temperature (Damping, Calibration and Units applied). This may be external RTD or sensor value depending on configuration	RO	

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	**16 bit**				
24	407 – 408	Float32	Mass flow rate value	RO	
25	409 – 410	Float32	Volume Flow rate value	RO	
26	411 – 412	U32	Diagnostic status flag words 1 and 2	RO	
27	413 – 414	U32	Diagnostic status flag words 3 and 4	RO	
28	415 – 416	U32	Diagnostic status flag words 5 and 6	RO	
41	441 – 442	Float32	DP calibration high point (span) Default URL. See 481 for unit of value	R/W	
42	443 – 444	Float32	DP calibration low point (offset). Default LRL. See 481 for unit of value	R/W	
43	445 – 446	Float32	SP calibration high point (span) Default URL. See 482 for unit of value	R/W	
44	447 – 448	Float32	SP calibration low point (offset). Default LRL. See 482 for unit of value	R/W	
45	450	U16	**Calibration Pressure Unit**: 1 = Inches H2O @ 4C 2 = Inches HG @ 0C 3 = Feet H2O @ 68F 4 = Millimeter H2O @ 68F 5 = Millimeter HG @ 0C 6 = PSI 7 = BAR 8 = Millibar 9 = Gram per square centimeter 10 = Kilogram per square centimeter 11 = Pascal 12 = Kilopascal 13 = Torr 14 = Atmosphere 117 = Megapascal 16 = Inches H2O @ 60F 17 = Inches H2O @ 68F **Note**: When this register has a value of 65535 (0xFFFF) the unit for Calibration Pressure is read from register 481.	R/W	
46	451 – 452	Float32	T calibration high point (span) default URL. See 483 for unit of value	R/W	
47	453 – 454	Float32	T calibration low point (offset) default 0 °C. See 483 for unit of value	R/W	

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	**16 bit**				
48	456	U16	**Calibration Temperature Unit**: 32 = Degree Celsius 33 = Degree Fahrenheit 34 = Degree Rankine 35 = Degree Kelvin **Note**: When this register has a value of 65535 (0xFFFF) the unit for Calibration Temperature is read from register 483.	R/W	
49 – 50	457 – 460		RESERVED un-implemented registers All access returns an ILLEGAL FUNCTION error code.	NONE	
51	461 – 462	Float32	DP Damping time constant (Default 0.0 = disabled)	R/W	
52	463 – 464	Float32	SP Damping time constant (Default 0.0 = disabled)	R/W	
53	465 – 466	Float32	T Damping time constant (Default 0.0 = disabled)	R/W	
54 – 190	467 – 740		RESERVED un-implemented registers All access returns an ILLEGAL FUNCTION error code.	NONE	
191	481	U16	**Differential Pressure Unit**: 1 = inches of water 8 = Millibar (ROM default) 11 = Pascal 12 = Kilopascal	R/W	
192	482	U16	**Static Pressure Unit**: 6 = PSIA 7 = Bar (ROM default) 12 = Kilopascal 117 = Megapascal	R/W	
193	483	U16	**Temperature Unit**: 32 = Degree Celsius (ROM default) 33 = Degree Fahrenheit 34 = Degree Rankine 35 = Degree Kelvin	R/W	
194	484	U16	Mass / Volume Flow Unit (ref 407-408 register)	R/W	
195	485	U16	Volume Flow Unit (ref 409-410 register)	R/W	
196 197 198	486 487 – 488 489 – 490		RESERVED un-implemented registers All access returns an ILLEGAL FUNCTION error code	NONE	

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	**16 bit**				
199	491	U16	Reset to factory configuration. Value written is the specific subsystem index to reset. -1 = ALL subsystem 0 = Coordinator subsystem 1 = Diagnosis subsystem 2 = Electronic subsystem 3 = HMI display subsystem 4 = Pressure subsystem 5 = Measurement sensor interface subsystem 6 = Service port interface subsystem 7 = Modbus subsystem 9 = Access role manager subsystem 10= Flow subsystem 11= Process temperature subsystem **Warning: all configuration for each subsystem will need to be reloaded.**	R/W	
200	492	U16	Modbus display text write lock. 0 = able to change display text see 1001-1018 1 = disabled register writes to 1001-1018	R/W	
205	501		RESERVED un-implemented registers All access returns an ILLEGAL FUNCTION error code	NONE	
206	502	U8	Baud rate selector 1 = 1200, 2=2400, 3=4800, 4=9600, 5=1200, 6=2400, 7=4800, 8=9600, 9=19200, 10=38400	R/W	
207	503	U8	Modbus Device address	R/W	
208	504	U8	Modbus turn-around response delay (ms per count)	R/W	
209	505	U8	Modbus protocol communication Parity 0 = None 1 = Even 2 = Odd	R/W	
210 – 211	1001-1004	Char	Display line 1, 8 ASCII characters per line. **Note**: The write protection Dip Switch does not protect this register. For protection see the settings for register 492.	R/W	
212-213	1005-1008	Char	Display line 2, 8 ASCII characters per line. **Note**: The write protection Dip Switch does not protect this register. For protection see the settings for register 492.	R/W	
214-218	1009-1018	Char	Display Tag 1 line, 20 ASCII characters per line. **Note**: The write protection Dip Switch does not protect this register. For protection see the settings for register 492.	R/W	
			Customer Diagnostic Limits		
5541	5041 – 5042	Float32	DP URV, Upper Range Value (default set to URL)	R/W	√
5542	5043 – 5044	Float32	DP LRV, Operating Lower Range Value (default set to LRL)	R/W	√
5543	5045 – 5046	Float32	SP URV, Operating Upper Range Value (default set to URL)	R/W	√

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	16 bit				
5544	5047 – 5048	Float32	SP LRV, Operating Lower Range Value (default set to 0.0697 MPa ~1 atm at 10000 ft ~10.1 psi)	R/W	√
5545	5049 – 5050	Float32	Transducer cell Temperature Operating Upper Range Value	R/W	√
5546	5051 – 5052	Float32	Transducer cell Temperature Operating Lower Range Value	R/W	√
5547	5053 – 5054	Float32	RTD Temperature Operating Upper Range Value	R/W	√
5548	5055 – 5056	Float32	RTD Temperature Operating Lower Range Value	R/W	√
			Customer Max / Min Values		
5549	5057 – 5058	Float32	DP Maximum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5550	5059 – 5060	Float32	DP Minimum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5551	5061 – 5062	Float32	SP Maximum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5552	5063 – 5064	Float32	SP Minimum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5553	5065 – 5066	Float32	Transducer Temperature Maximum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5554	5067–5068	Float32	Transducer Temperature Minimum measured value Write always sets value to current measurement, the value from the write request is ignored.	R/W	√
5555	5069–5070	Float32	RTD Maximum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
5556	5071–5072	Float32	RTD Minimum measured value Write always sets value to current measurement; the value from the write request is ignored.	R/W	√
			Service Max value ever measured		
5557	5073–5074	Float32	DP Maximum ever measured value	RO	√
5558	5075–5076	Float32	DP Minimum ever measured value	RO	√
5559	5077–5078	Float32	SP Maximum ever measured value	RO	√
5560	5079–5080	Float32	SP Minimum ever measured value	RO	√
5561	5081–5082	Float32	Transducer Temperature Maximum ever measured value	RO	√
5562	5083–5084	Float32	Transducer Temperature Minimum ever measured value	RO	√
5563	5085–5086	Float32	RTD Maximum ever measured value	RO	√
5564	5087–5088	Float32	RTD Minimum ever measured value	RO	√
			Customer Operating Range Alarm Levels		
5565	5089- 5090	Float32	DP Above URV Alarm Set at this level (in DP units) referenced to register 5541 URV + ((URV-LRV) * DPHysteresis * 0.01)	RO	√
5566	5091- 5092	Float32	DP Below LRV Alarm Set at this level (in DP units) referenced to register 5542 LRV - ((URV-LRV) * DPHysteresis * 0.01)	RO	√
5567	5093-5094	Float32	DP Below URV Alarm Clears at this level (in DP units) referenced to register 5541 URV - ((URV-LRV) * DPHysteresis * 0.01 / 2)	RO	√
5568	5095-5096	Float32	DP Above LRV Alarm Clears at this level (in DP Units) referenced to register 5542 LRV + ((URV-LRV) * DPHysteresis * 0.01 / 2)	RO	√

Register Address		Data Type	Object description	Read/ Write	Added Ext.
32 bit	16 bit				
5569	5097-5098	Float32	DP Alarm Hysteresis Percent of User Range Span referenced to register 5541 & 5542 (default 2%) (DPHysteresis)	RO	√
5570	5099-5100	Float32	SP Alarm Hysteresis Percent of User Range Span referenced to register 5543 & 5544 (default 2%) (SPHysteresis)	RO	√
5571	5101-5102	Float32	SP Above URV Alarm Set at this level (in SP units) referenced to register 5543 URV + ((URV-LRV) * SPHysteresis * 0.01)	RO	√
5572	5103-5104	Float32	SP Below LRV Alarm Set at this level (in SP units) referenced to register 5544 URV - ((URV-LRV) * SPHysteresis * 0.01)	RO	√
5573	5105-5106	Float32	SP Below URV Alarm Clears at this level (in SP units) referenced to register 5543 LRV - ((URV-LRV) * SPHysteresis * 0.01 / 2)	RO	√
5574	5107-5108	Float32	SP Above LRV Alarm Clears at this level (in Sp Units) referenced to register 5544 LRV + ((URV-LRV) * SPHysteresis * 0.01 / 2)	RO	√
			Measurements Bias Parameters		
5575	5109-5110	Float32	DP bias value is being added to the DP measurement producing an overall offset adjustment.	RO	√
5576	5111 – 5112	Float32	SP bias, see preceding register for discussion.	RO	√
5577	5113 – 5114	Float32	Set DP to a value, units are same as the DP measurement. DP bias = value – current measurement. This results in the reported value in register 401-402 to be the value.	R/W	√
5578	5115 – 5116	Float32	Set SP to value, see preceding register for discussion.	R/W	√
5579	5117	x	Reset DP Bias, sets the bias value to zero, effectively removing any effects of bias on DP measurement. This is an action register, and the data value has no meaning.	WO	√
5580	5118	x	Reset SP Bias, sets the bias value to zero, see preceding register.	WO	√
			Informative / Maintenance (Available in all Modbus mapping modes)		
64001	64001	U8	Modbus mapping selection: 0 = ABB map 1 = Rosemount map 2 = Invensys map	RO	√
64002	64002-64003	U32	Date and time the CB firmware was built. Julian date number of seconds since Jan 01, 1970, 00:00:00	RO	√

4 Rosemount™ 3095FB emulation registers

IMPORTANT NOTE: Emulation is only supported by the 266JST.

Table 4-1:Rosemount MODBUS registers

Register Address		Type	*Constant / Default	Object description
32 bit	16 bit			
7001	1	U8	*0	Manufacturer's Code Rosemount
7002	2	U8	*31	Transmitter Type Code Multivariable Transmitter with Modbus
7003	3	U8+U8	*0x6803	Output Board Software Rev Level (rev 104.3)
7004	4	U8	*4	Sensor Module Software Rev Level
7005-7006	5 & 6	U24		Device serial Number made from the 32 byte transducer number. The number is made from the last 6 decimal digits in the string. See (ABB map register 0001-0008) Ex. "T123456789001" Reg 5&6 read as 32bit integer is 789001 Reg 5 read as 16bit integer is 0x000C Reg 6 read as 16bit integer is 0x0A09
7007-7008	7 & 8	U24		Same information as 7005-7006.
7009	09	U8	*0	Hardware Rev Level
7010	10	U8	*16	Modbus Specific Rev Level
Yes 7011	11	U8	*23	Sensor Type absolute SP
7012	12	U8	*1	Reserved
7013	13	U8	*0	Reserved
7014	14	U8	*0	Reserved
7015	15	U8	8	Baud rate selector 1 = 1200, 2 = 2400, 3 = 4800, 4 = 9600, 5 = 1200, 6 = 2400, 7 = 4800, 8 = 9600, 9 = 19200
7016	16	U8	247	Modbus Transmitter address
7017	17	U8	*252	DP Sensor Range Code (unknown code)
7018	18	U8	*252	SP Sensor Range Code
7019	19	U8	*252	PT Sensor Range Code
7020	20	U8	*252	Module Isolator Code
7021	21	U8	*252	Module Fill Fluid Code
7022	22	U8	*252	flange material code
7023	26	U8	*252	flange type code
7024	24	U8	*252	drain/vent code
7025	25	U8	*252	O-ring gasket material
7026	26	U8	*252	remote seal type

Register Address		Type	*Constant / Default	Object description
32 bit	**16 bit**			
7027	27	U8	*252	remote seal fill fluid
7028	28	U8	*252	remote seal isolator material
7029	29	U8	*252	number of remote seals
7030 – 7031	30 – 31	U32	*0	N/A
7032 – 7041	32 – 41	U8 string	Read/Write	user-entered tag, user-entered descriptor, 20 char
7042 – 7056	42 – 56	U8 string	Read	Nonvolatile memory page 30 bytes
7057	57	U8	*0	N/A
7058	58	U8	*0	N/A
7059	59	U8	*0	N/A
*** Means these are ROM constant defaults and a read will always return these values.**				
7060	60	U8	†	**Differential Pressure unit**: 1 = inch of water at 60 °F (ROM default) 2 = Pascal 3 = Kilopascals 6 = inches of water at 68 °F
7061	61	U8	†	**Static Pressure unit**: 3 = Kilopascal 4 = Megapascal 5 = PSIA (ROM default)
7062	62	U8	†	**Temperature unit**: 20 = Degree Celsius 21 = Degree Fahrenheit (ROM default)
7131	131	U8		Modbus turn-around response delay (ms per count)
† Value selected using HMI must equal one of these specific measurement units, or a NAK will be returned.				
7401	401 – 402	Float32		Differential Pressure (Damping, Calibration and Units applied) floating point, 401 is high word, 402 is low word.
7402	403 – 404	Float32		Static Pressure (Damping, Calibration and Units applied) floating point, 401 is high word, 402 is low word.
7403	405 – 406	Float32		Process Temperature (Damping, Calibration and Units applied) floating point, 401 is high word, 402 is low word. This may be external RTD or sensor value depending on configuration.
7404	407 – 408	U32		Diagnostics Status Word 1 and 2
7405	409 – 410	U32		Diagnostics Status Word 3 and 4
7406	411 – 412	U32		Diagnostics Status Word 5 and 6
7407	413 – 414	Float32		DP URL, Upper Range Limit (Set by Measurement Sensor)
7408	415 – 416	Float32		DP LRL, Lower Range Limit (Set by Measurement Sensor)
7409	417 – 418	Float32		DP URV, Operating Upper Range Value (default URL)
7410	419 – 420	Float32		DP LRV, Operating Lower Range Value (default LRL)
7411	421 – 422	Float32		SP URL, Upper Range Limit (Set by Measurement Sensor)
7412	423 – 424	Float32		SP LRL, Lower Range Limit (Set by Measurement Sensor)

Register Address		Type	*Constant / Default	Object description
32 bit	16 bit			
7413	425 – 426	Float32		SP URV, Operating Upper Limit (default SP URL)
7414	427 – 428	Float32		SP LRV, Operating Lower Limit (default SP LRL)
7415	429 – 430	Float32		T URL, Upper Range Limit (default 850ºC)
7416	431 – 432	Float32		T LRL, Lower Range Limit(default -200ºC)
7417	433 – 434	Float32		T URV, Operating Upper Range Value (default URL)
7418	435 – 436	Float32		T LRV, Operating Lower Range Value (default LRL)
7419	437 – 438	Float32		DP offset calibration value (default 0.0)
7420	439 – 440	Float32		DP span calibration value (default URL)
7421	441 – 442	Float32		DP damping (default 0.0)
7422	443 – 444	Float32		SP offset calibration value (default 0.0)
7423	445 – 446	Float32		SP span calibration value (default URL)
7424	447 – 448	Float32		SP damping (default 0.0)
7425	449 – 450	Float32		T offset calibration value (default 0.0)
7426	451 – 452	Float32		T span calibration value (default URL)
7427	453 – 454	Float32		T dampening (default 0.0)

5 Invensys IMV25 emulation registers

IMPORTANT NOTE: Emulation is only supported by the 266JST.

Invensys Model IMV25 MODBUS® compatibility register map will use the Rosemount map after subtracting 40000 from the requested register address. The fixed register range 40000 – 40500 is used for this emulation mode.

For example, an Invensys register of 40401 will be a Rosemount register of 401.

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