


Funktionsbeschreibung / Application Note		
<i>Produkt / product</i> MSE 300 AE6.3x	<i>Kurzbeschreibung / short description</i> ModBus Communication between MSE and Customer PLC	
<i>Dokumentname / document name</i> AN200312 AE6 V63x ModBus Communication-1		

<i>Version</i>	<i>Datum</i>	<i>Thema/Bezug</i>	<i>Autor</i>
001	05.04.2019	Erstausgabe: ModBus Liste für V.6.22	HG
002	12.03.2020	MSE V.6.30ff	HG
003	19.05.2020	Physical connections update	MF

1 ModBus Communication between Evaluation Unit MSE / AE6.1x and Customer PLC

1.1 Corresponding Devices

This manual describes the Communication between Evaluation Unit and Customer PLC using ModBus RTU for the following Sensor Systems:

- Multi Sensor Evaluation Unit MSE300 AE6 V6.3x
- Evaluation Units may be Field Housing or Din Rail Housing

In the following document all those systems will be called MSE.

1.2 General ModBus Settings

1.2.1 2 Wire Connection

- Modbus uses serial Connection via RS485
- RS485 is a serial bus communication layer
- Modbus is used in RTU Mode
- COM Port setting is 9600,8,E,1 (9600 Baud, 8 Databits, EVEN Parity, 1 Stopbit)
- Standard Modbus Slave Address is 1
- Slave Address and Baud Rate can be changed/checked on the Evaluation Unit Menu Point 5

5. System	
5.1 Baud rate	Select: 4800 / 9600 / 19200 / 38400 Bd
5.2 ModBus address	Range: 1 --- 255

1.2.2 USB

- On the frontside MSE is equipped with a USB connection Type B
- USB is supporting a virtual COM Port via FTDI chip
- Actual FTDI USB Virtual COM Port driver is required
- USB is a point-to-point connection
- Modbus is used in RTU Mode
- COM Port setting is 9600, 8, E,1 (9600 Baud, 8 Databits, EVEN Parity, 1 Stopbit)
- MSE is listening to all Modbus Slave Addresses
- Slave Address and Baud Rate cannot be changed

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300
AE6.3x

Kurzbeschreibung / short description

ModBus Communication between
MSE and Customer PLC

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

2/17

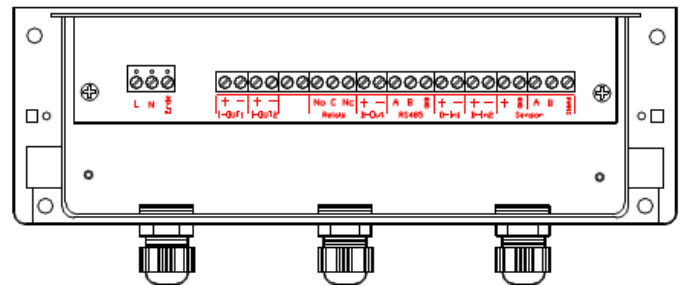
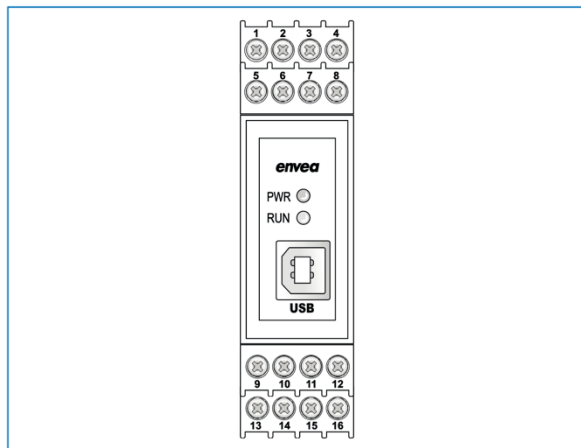


2 Physical connections

MSE uses Modbus RTU Modus on a 2 wire RS485 physical layer or on frontside USB.

ModBus is connected to the MSE according to the User Manual:

1 Current output - 4 ... 20 mA	2 Current output + 4 ... 20 mA	3 Input Power supply 0 V DC	4 Input Power supply + 24 V DC
5 Not used	6 Alarm relay NC (break contact)	7 Alarm relay C	8 Alarm relay NO (make contact)



MSE 300 FH

RS 485	A	RS 485 Schnittstelle Daten A (+)
	B	RS 485 Schnittstelle Daten B (-)
	GND	RS 485 Schnittstelle Ground

9 Digital pulse output (-)	10 Digital pulse output (+)	11 RS 485 Interface Data B	12 RS 485 Interface Data A
13 Sensor connection Cable 4 RS 485 Data B	14 Sensor connection Cable 3 RS 485 Data A	15 Sensor connection Cable 2 Power supply 0 V	16 Sensor connection Cable 1 Power supply + 24 V

MSE 300 DR



CONNECTION


1	RELAY	NO
2	RELAY	COM
3	RELAY	NC
5	OPEN COLLECTOR 1	+
6	OPEN COLLECTOR 1	-
7	OPEN COLLECTOR 2	+
8	OPEN COLLECTOR 2	-
9	I-OUT 1	4...20mA +
10	I-OUT 1	4...20mA -
11	I-OUT 2	4...20mA +
12	I-OUT 2	4...20mA -
17	SENSOR	+24V
18	SENSOR	GND
19	SENSOR	DATA-A
20	SENSOR	DATA-B
21	INPUT POWER	+24V
22	INPUT POWER	GND
23	RS485	A
24	RS485	B

MSE 300 DR2

		Typical Connetor Descriptions (may vary by used Adapter)		
RS485 Interface on Evaluation Unit	A	Data A+	A	
	B	Data A-	B	
	GND	GND	GND	

GND Connection is normally not necessary on RS485. It is recommended as a shield connected on one side of the ModBus Cable.

If you use RS232 bridging devices the wires Rx, Tx and GND are a must!

Funktionsbeschreibung / Application Note		
<i>Produkt / product</i> MSE 300 AE6.3x	<i>Kurzbeschreibung / short description</i> ModBus Communication between MSE and Customer PLC	
<i>Dokumentname / document name</i> AN200312 AE6 V63x ModBus Communication-1		

3 Modbus Communication with Modbus Commands

3.1 Supported ModBus Functions

To establish ModBus communication the following ModBus functions are available:


- Function 03: 'read holding registers'
- Function 06: 'preset single register' (only 'Read/Write' variables)
- Function 16: 'preset multiple registers' (only 'Read/Write' variables)

3.2 Abbreviations of Data Types

All ModBus Register values are represented and sent as 16bit Integer values. If values are represented in another format (e.g. Long, Float) they are transmitted as two or more 16bit Integer values.

There are several datatype abbreviations used:

Abbreviation	Format	Example
Int16	16bit Number	
Long	32bit Number	Two 16bit Registers, Lower Double Byte in lower Register Number
Float	32bit ANSI Format	Two 16bit Registers, Lower Double Byte in lower Register Number
FPx	Fix Point with x decimal places	Integer or Long number must be divided by 10 ^x FP1: 1234 = 123.4 FP2: 1234 = 12.34 FPx: decimal places equal to display setting
Flag	Binary Interpretation	Individual, see description
ASCII	String	String length is 2*(No of Registers)

Funktionsbeschreibung / Application Note		
<i>Produkt / product</i> MSE 300 AE6.3x	<i>Kurzbeschreibung / short description</i> ModBus Communication between MSE and Customer PLC	
<i>Dokumentname / document name</i> AN200312 AE6 V63x ModBus Communication-1	<i>Seite:</i> 4/17	

3.3 ModBus Registers

The following ModBus Register values are available for customers demand (other ModBus Register values are reserved for internal functions):

3.3.1 Status Commands and Flags

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
dev_id	Device Identification '555' – Multisensor MSE Type Software	1001	Int16	R/O	03
ver_num	FW Version Number	1002	Int16 FP2	R/O	03
error	Initialization Error: bit0 - Parameter Set #1 fault bit1 - Parameter Set #2 fault bit2 – Calibration Set #1 fault bit3 – Calibration Set #2 fault bit4 - Totalizer #1 fault bit5 - Totalizer #2 fault bit8 - Parameter Set cannot be restored (both Parameter Sets are corrupt). (Default Parameter Set in use) bit9 – Calibration Set cannot be restored (both Calibration Sets are corrupt). (default Calibration Set in use) bit10 –Totalizer cannot be restored (both Totalizer Sets are corrupt). Totalizer reset.	1003	Flag	R/O	03
param_wr_flg	Register > 0 writes Parameter Set to EEPROM, auto reset	1004	Flag	R/W	03,06,16
calib_wr_flg	Register > 0 writes Calibration Set to EEPROM, auto reset	1005	Flag	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

**MSE 300
AE6.3x**

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

5/17



3.3.2 Sensor Types and Status

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
sensor_OK	Sensor Communication Status 1 - OK, 0 – Error bit 0 - Sensor #1 bit 1 - Sensor #2 bit 2 - Sensor #3	1006	Flag	R/O	03
Sensor1_fw_type	Sensor ID: Identification of Sensor	1007	Int16	R/O	03
Sensor2_fw_type	Sensor ID: Identification of Sensor	1008	Int16	R/O	03
Sensor3_fw_type	Sensor ID: Identification of Sensor	1009	Int16	R/O	03
Sensor1_sys_stat	Sensor Status Word	1010	Flag	R/O	03
Sensor2_sys_stat	Sensor Status Word	1011	Flag	R/O	03
Sensor3_sys_stat	Sensor Status Word	1012	Flag	R/O	03
Sensor1_err_word	Sensor Error Word	1013	Flag	R/O	03
Sensor2_err_word	Sensor Error Word	1014	Flag	R/O	03
Sensor3_err_word	Sensor Error Word	1015	Flag	R/O	03
Sensor1_temp	Sensor Temperature	1016	Int16, FP4	R/O	03
Sensor2_temp	Sensor Temperature	1017	Int16, FP4	R/O	03
Sensor3_temp	Sensor Temperature	1018	Int16, FP4	R/O	03
Sensor1_ver	Sensor Firmware Version	1019	Int16 FP2	R/O	03
Sensor2_ver	Sensor Firmware Version	1020	Int16 FP2	R/O	03
Sensor3_ver	Sensor Firmware Version	1021	Int16 FP2	R/O	03

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300
AE6.3x

Kurzbeschreibung / short description

ModBus Communication between
MSE and Customer PLC

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

6/17



3.3.3 Process Values

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
raw_val_1	Sensor #1: Process Raw Value MaxxFloW/DensFloW: Density Raw Other: Sensor 1 Raw	1022	float	R/O	03
raw_val_3	Sensor #2: Process Raw Value MaxxFloW/DensFloW: Flow Raw Other: Sensor 2 Raw	1024	float	R/O	03
raw_val_3	Sensor #3: Process Raw Value MaxxFloW/DensFloW: Vel. Raw Other: Sensor 3 Raw	1026	float	R/O	03
Autocal_stat	Status of Auto Calibration 1 - off 2 - on 3 - Stopped (Sensor Error) 4 - Stopped (Low Flow) 5 - Stopped (Digital IN)	1028	Int16	R/O	03
Raw_average	Mean of Process Raw (All Sensors)	1029	float	R/O	03
Sens1_cal	Sensor #1: Process Value calib. (only in effect if individual calibration is selected)	1031	Int16 FPx	R/O	03
Sens2_cal	Sensor #2: Process Value calib. (only in effect if individual calibration is selected)	1032	Int16 FPx	R/O	03
Sens3_cal	Sensor #3: Process Value calib. (only in effect if individual calibration is selected)	1033	Int16 FPx	R/O	03
main_value	Process Value Flow Rate. Same as the Value on Evaluation Unit display. (Decimal place and Unit have to be taken from Parameter Set!)	1034	Int16 FPx	R/O	03
norm_value	Process Value Flow Rate Norm. Normalized to 0-100% of the metering range between Set Point Low and Set Point High.	1035	Int16 FP2	R/O	03
Alarm_stat	Alarm status	1039	Flag	R/O	03

Funktionsbeschreibung / Application Note*Produkt / product***MSE 300****AE6.3x***Kurzbeschreibung / short description***ModBus Communication between
MSE and Customer PLC***Dokumentname / document name***AN200312 AE6 V63x ModBus Communication-1***Seite:***7/17**

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
	0 – output not active 1 – output active				
Totalisator	Totalizer value (Decimal place and Unit have to be taken from Parameter Set!)	1050	Int32 FPx	R/O	03

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300

AE6.3x

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

8/17



3.3.4 Parameter Table

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
M_UNIT	Physical unit on display	2001	ASCII-4	R/W	03,06,16
PROD_NAME	Productname on display	2003	ASCII-10	R/W	03,06,16
LANG	Display language 0 - D 1 - E 2 - F	2014	Flag	R/W	03,06,16
DECP	Display decimal point: 0 - '0000.' 1 - '000.0' 2 - '00.00' 3 - '0.000'	2015	Flag	R/W	03,06,16
DSP_0	Set Point Low	2016	Int16 FPx	R/W	03,06,16
DSP_100	Set Point High	2017	Int16 FPx	R/W	03,06,16
FILTER	Filtertime Metering Value 1 Digit = 0.1s	2018	Int16	R/W	03,06,16
unit_ProSens	Physical unit on display (ProSens only)	2019 .. 2021	ASCII-6	R/W	03,06,16
unit_speed	Physical unit on display (Speed) 0 - m/s 1 - mm/s 2 - ft/s	2022	int16	R/W	03,06,16
Low_flow_cut	Low-Flow Limit	2023	Int16 FP1	R/W	03,06,16
Pulse_out_mode	Mode of the Pulse output 0 - off 1 - cleaning 2 - mass flow	2024	Int16	R/W	03,06,16
Clean_cycle	period	2025	Int16	R/W	03,06,16
Clean_pulse	Puls	2026	Int16	R/W	03,06,16
S_filt_len	Screw-Conveyor Filter Length [sam] (MSens)	2027	Int16	R/W	03,06,16
S_filt_lim	Screw-Conveyor Filter Limit [%] (MSens)	2028	Int16	R/W	03,06,16
AL_STAT1	Alarm Mode 1	2029	Int16	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300**AE6.3x**

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

9/17

	0 - OFF 1 - MIN-Alarm 2 - MAX-Alarm 3 - FLOW (if supported)				
AL_STAT2	Alarm Mode 2 0 - Arbeitsstrom NO 1 - Ruhestrom NC	2030	Int16	R/W	03,06,16
AL_VAL	Alarm Value (depending on Sensor Type FPx)	2031	Int16 (FPx)	R/W	03,06,16
AL_HYST	Alarm - Hysteresis (1Digit equals 0.1%)	2032	Int16 FP1	R/W	03,06,16
AL_DEL	Alarm - Delay (1Digit equals 0.1s)	2033	Int16 FP1	R/W	03,06,16
AL_SENSOR	Alarm – Sensoralarm 0 - OFF 1 - Sensor Error ERR 2 - Process Indicator PROC	2034	Int16	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300

AE6.3x

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

10/17



3.3.5 Calibration Table

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
sensor_mode	Selected Sensor Type 0 - SolidFlow 1 - PicoFlow 2 - ProSens 3 - SpeedFlow 4 - Paddy 5 - MaxxFLOW 6 - DensFlow 7 - SlideControl 8 - Msens3-FD/PT 9 - MSensWR 10 - MSens2 Std	3193	int16		

3.3.5.1 For all Sensors (excluding MaxxFLOW and DensFlow Types)

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
CAL_CNT	No. Of Calibration Points	3003	Int16	R/W	03,06,16
CAL_FILT	Calibration Filter in seconds	3004	Int16	R/W	03,06,16
CAL_MULT	Calibration Factor Kk	3005	Int16 FP2	R/W	03,06,16
CAL_SENS_STAT	Sensor Activation Flag bit0 - Sensor 1 bit1 - Sensor 2 bit2 - Sensor 3	3006	Flag	R/W	03,06,16
CAL1_PHYS_1	Sensor#1 Calibration Point 1 (physical)	3007	Int16 FPx	R/W	03,06,16
CAL1_PHYS_2	Sensor#1 Calibration Point 2 (physical)	3008	Int16 FPx	R/W	03,06,16
CAL1_PHYS_3	Sensor#1 Calibration Point 3 (physical)	3009	Int16 FPx	R/W	03,06,16
CAL1_PHYS_4	Sensor#1 Calibration Point 4 (physical)	3010	Int16 FPx	R/W	03,06,16
CAL1_PHYS_5	Sensor#1 Calibration Point 5 (physical)	3011	Int16 FPx	R/W	03,06,16
CAL2_PHYS_1	Sensor#2 Calibration Point 1 (Physical)	3027	Int16 FPx	R/W	03,06,16
CAL2_PHYS_2	Sensor#2 Calibration Point 2 (Physical)	3028	Int16 FPx	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300**AE6.3x**

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

11/17



Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
CAL2_PHYS_3	Sensor#2 Calibration Point 3 (Physical)	3029	Int16 FPx	R/W	03,06,16
CAL2_PHYS_4	Sensor#2 Calibration Point 4 (Physical)	3030	Int16 FPx	R/W	03,06,16
CAL2_PHYS_5	Sensor#2 Calibration Point 5 (Physical)	3031	Int16 FPx	R/W	03,06,16
CAL3_PHYS_1	Sensor#3 Calibration Point 1 (Physical)	3047	Int16 FPx	R/W	03,06,16
CAL3_PHYS_2	Sensor#3 Calibration Point 2 (Physical)	3048	Int16 FPx	R/W	03,06,16
CAL3_PHYS_3	Sensor#3 Calibration Point 3 (Physical)	3049	Int16 FPx	R/W	03,06,16
CAL3_PHYS_4	Sensor#3 Calibration Point 4 (Physical)	3050	Int16 FPx	R/W	03,06,16
CAL3_PHYS_5	Sensor#3 Calibration Point 5 (Physical)	3051	Int16 FPx	R/W	03,06,16
CAL1_ABS_1	Sensor #1 Calibration Point 1 (Absolut)	3067	Int16 FPx	R/W	03,06,16
CAL1_ABS_2	Sensor #1 Calibration Point 2 (Absolut)	3069	Int16 FPx	R/W	03,06,16
CAL1_ABS_3	Sensor #1 Calibration Point 3 (Absolut)	3071	Int16 FPx	R/W	03,06,16
CAL1_ABS_4	Sensor #1 Calibration Point 4 (Absolut)	3073	Int16 FPx	R/W	03,06,16
CAL1_ABS_5	Sensor #1 Calibration Point 5 (Absolut)	3075	Int16 FPx	R/W	03,06,16
CAL2_ABS_1	Sensor #2 Calibration Point 1 (Absolut)	3107	Int16 FPx	R/W	03,06,16
CAL2_ABS_2	Sensor #2 Calibration Point 2 (Absolut)	3109	Int16 FPx	R/W	03,06,16
CAL2_ABS_3	Sensor #2 Calibration Point 3 (Absolut)	3111	Int16 FPx	R/W	03,06,16
CAL2_ABS_4	Sensor #2 Calibration Point 4 (Absolut)	3113	Int16 FPx	R/W	03,06,16
CAL2_ABS_5	Sensor #2 Calibration Point 5 (Absolut)	3115	Int16 FPx	R/W	03,06,16
CAL3_ABS_1	Sensor #3 Calibration Point 1 (Absolut)	3147	Int16 FPx	R/W	03,06,16
CAL3_ABS_2	Sensor #3 Calibration Point 2 (Absolut)	3149	Int16 FPx	R/W	03,06,16

Funktionsbeschreibung / Application Note*Produkt / product***MSE 300****AE6.3x***Kurzbeschreibung / short description***ModBus Communication between
MSE and Customer PLC***Dokumentname / document name***AN200312 AE6 V63x ModBus Communication-1***Seite:***12/17**

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
CAL3_ABS_3	Sensor #3 Calibration Point 3 (Absolut)	3151	Int16 FPx	R/W	03,06,16
CAL3_ABS_4	Sensor #3 Calibration Point 4 (Absolut)	3153	Int16 FPx	R/W	03,06,16
CAL3_ABS_5	Sensor #3 Calibration Point 5 (Absolut)	3155	Int16 FPx	R/W	03,06,16
CAL_1_MULT	Sensor #1 Calibration Factor	3187	Int16 FP2	R/W	03,06,16
CAL_2_MULT	Sensor #2 Calibration Factor	3188	Int16 FP2	R/W	03,06,16
CAL_3_MULT	Sensor #3 Calibration Factor	3189	Int16 FP2	R/W	03,06,16
CAL_MODE	Calibration Mode 0 - individual sensors 1 - mean of sensors	3192	Int16	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300

AE6.3x

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:

13/17



3.3.5.2 MaxxFLOW / Densflow Types

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
Maxxf_cal_mode	MaxxFLOW / DensFlow Calibration Mode 0 - easyFlow 1 - easyFull 2 - separate / single	3194	int16	R/W	03,06,16
Maxxf_cal_pt	No. Of Calibration Points	3195	int16	R/W	03,06,16
ref_sensor	0 - E2C/E3C not active 1 - E2C/E3C active	3197	int16	R/W	03,06,16
ref_sensor_mode	0 - manual 1 - auto	3198	int16	R/W	03,06,16
Conv_mode	Conveying Mode 0 - Freefall 1 - Slide 2 - Pneumatic	3200	int16	R/W	03,06,16
Fall_h	Drop Height [mm]	3201	int16	R/W	03,06,16
Qq_limit	Quality Limit [%]	3202	int16	R/W	03,06,16
Cal_ef_mult	easyFlow: Calib.-Factor	3196	int16 FP2	R/W	03,06,16
Cal_ef_ph_1	easyFlow: Cal.Pt1 - Physikalisch	3209	int16 FP2	R/W	03,06,16
Cal_ef_ph_2	easyFlow: Cal.Pt2 - Physikalisch	3210	int16 FP2	R/W	03,06,16
Cal_ef_ph_3	easyFlow: Cal.Pt3 - Physikalisch	3211	int16 FP2	R/W	03,06,16
Cal_ef_ph_4	easyFlow: Cal.Pt4 - Physikalisch	3212	int16 FP2	R/W	03,06,16
Cal_ef_ph_5	easyFlow: Cal.Pt5 - Physikalisch	3213	int16 FP2	R/W	03,06,16
Cal_ef_qd_1	easyFlow: Cal.Pt1 – QD (Mean)	3214	int16	R/W	03,06,16
Cal_ef_qd_2	easyFlow: Cal.Pt2 – QD (Mean)	3215	int16	R/W	03,06,16
Cal_ef_qd_3	easyFlow: Cal.Pt3 – QD (Mean)	3216	int16	R/W	03,06,16
Cal_ef_qd_4	easyFlow: Cal.Pt4 – QD (Mean)	3217	int16	R/W	03,06,16
Cal_ef_qd_5	easyFlow: Cal.Pt5 – QD (Mean)	3218	int16	R/W	03,06,16
Cal_ef_qq_1	easyFlow: Cal.Pt1 – QQ (Mean)	3219	int16	R/W	03,06,16
Cal_ef_qq_2	easyFlow: Cal.Pt2 – QQ (Mean)	3220	int16	R/W	03,06,16
Cal_ef_qq_3	easyFlow: Cal.Pt3 – QQ (Mean)	3221	int16	R/W	03,06,16
Cal_ef_qq_4	easyFlow: Cal.Pt4 – QQ (Mean)	3222	int16	R/W	03,06,16

Funktionsbeschreibung / Application Note

Produkt / product

MSE 300**AE6.3x**

Kurzbeschreibung / short description

**ModBus Communication between
MSE and Customer PLC**

Dokumentname / document name

AN200312 AE6 V63x ModBus Communication-1

Seite:


14/17



Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
Cal_ef_qv_5	easyFlow: Cal.Pt5 – QQ (Mean)	3223	int16	R/W	03,06,16
Cal_ef_qv_1	easyFlow: Cal.Pt1 – QV (Mean)	3224	int16	R/W	03,06,16
Cal_ef_qv_2	easyFlow: Cal.Pt2 – QV (Mean)	3225	int16	R/W	03,06,16
Cal_ef_qv_3	easyFlow: Cal.Pt3 – QV (Mean)	3226	int16	R/W	03,06,16
Cal_ef_qv_4	easyFlow: Cal.Pt4 – QV (Mean)	3227	int16	R/W	03,06,16
Cal_ef_qv_5	easyFlow: Cal.Pt5 – QV (Mean)	3228	int16	R/W	03,06,16
Cal_ef_v_1	easyFlow: Cal.Pt1 – Velocity	3229	float	R/W	03,06,16
Cal_ef_v_2	easyFlow: Cal.Pt2 – Velocity	3231	float	R/W	03,06,16
Cal_ef_v_3	easyFlow: Cal.Pt3 – Velocity	3233	float	R/W	03,06,16
Cal_ef_v_4	easyFlow: Cal.Pt4 – Velocity	3235	float	R/W	03,06,16
Cal_ef_v_5	easyFlow: Cal.Pt5 – Velocity	3237	float	R/W	03,06,16
Cal_ef_drtcl_1	easyFlow: Cal.Pt1 – Density	3239	float	R/W	03,06,16
Cal_ef_drtcl_2	easyFlow: Cal.Pt2 – Density	3241	float	R/W	03,06,16
Cal_ef_drtcl_3	easyFlow: Cal.Pt3 – Density	3243	float	R/W	03,06,16
Cal_ef_drtcl_4	easyFlow: Cal.Pt4 – Density	3245	float	R/W	03,06,16
Cal_ef_drtcl_5	easyFlow: Cal.Pt5 – Density	3247	float	R/W	03,06,16
Cal_ef_qr_1	easyFlow: Cal.Pt1 – Flow	3249	float	R/W	03,06,16
Cal_ef_qr_2	easyFlow: Cal.Pt2 – Flow	3251	float	R/W	03,06,16
Cal_ef_qr_3	easyFlow: Cal.Pt3 – Flow	3253	float	R/W	03,06,16
Cal_ef_qr_4	easyFlow: Cal.Pt4 – Flow	3255	float	R/W	03,06,16
Cal_ef_qr_5	easyFlow: Cal.Pt5 – Flow	3257	float	R/W	03,06,16
Cal_full_phy	easyFull – Bulk Density	3274	Int16 FP2	R/W	03,06,16
Unit_factor	EasyFull – Unit correction factor	3275	Float	R/W	03,06,16
Cal_full_drctl	easyFull – Bulk Density Raw Value	3277	float	R/W	03,06,16
Cal_ex_vcal_1	Expert: Cal.Pt1 – V (physical)	3279	float	R/W	03,06,16
Cal_ex_vcal_2	Expert: Cal.Pt2 – V (physical)	3281	float	R/W	03,06,16
Cal_ex_vcal_3	Expert: Cal.Pt3 – V (physical)	3283	float	R/W	03,06,16
Cal_ex_vcal_4	Expert: Cal.Pt4 – V (physical)	3285	float	R/W	03,06,16
Cal_ex_vcal_5	Expert: Cal.Pt5 – V (physical)	3287	float	R/W	03,06,16
Cal_ex_dcal_1	Expert: Cal.Pt1 – Dens. (physical)	3289	float	R/W	03,06,16
Cal_ex_dcal_2	Expert: Cal.Pt2 – Dens. (physical)	3290	float	R/W	03,06,16
Cal_ex_dcal_3	Expert: Cal.Pt3 – Dens. (physical)	3291	float	R/W	03,06,16
Cal_ex_dcal_4	Expert: Cal.Pt4 – Dens. (physical)	3292	float	R/W	03,06,16
Cal_ex_dcal_5	Expert: Cal.Pt5 – Dens. (physical)	3293	float	R/W	03,06,16
Cal_ex_vraw_1	Expert: Cal.Pt1 – V Raw Value	3294	float	R/W	03,06,16
Cal_ex_vraw_2	Expert: Cal.Pt2 – V Raw Value	3296	float	R/W	03,06,16
Cal_ex_vraw_3	Expert: Cal.Pt3 – V Raw Value	3298	float	R/W	03,06,16
Cal_ex_vraw_4	Expert: Cal.Pt4 – V Raw Value	3300	float	R/W	03,06,16


Funktionsbeschreibung / Application Note*Produkt / product***MSE 300
AE6.3x***Kurzbeschreibung / short description***ModBus Communication between
MSE and Customer PLC***Dokumentname / document name***AN200312 AE6 V63x ModBus Communication-1***Seite:***15/17**

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
Cal_ex_vraw_5	Expert: Cal.Pt5 – V Raw Value	3302	float	R/W	03,06,16
Cal_ex_draw_1	Expert: Cal.Pt1 – Dens Raw Value	3304	float	R/W	03,06,16
Cal_ex_draw_2	Expert: Cal.Pt2 – Dens Raw Value	3306	float	R/W	03,06,16
Cal_ex_draw_3	Expert: Cal.Pt3 – Dens Raw Value	3308	float	R/W	03,06,16
Cal_ex_draw_4	Expert: Cal.Pt4 – Dens Raw Value	3310	float	R/W	03,06,16
Cal_ex_draw_5	Expert: Cal.Pt5 – Dens Raw Value	3312	float	R/W	03,06,16
Cal_ex_dens100	Bulk Density	3314	Int32 FP1	R/W	03,06,16

Funktionsbeschreibung / Application Note		
<i>Produkt / product</i> MSE 300 AE6.3x	<i>Kurzbeschreibung / short description</i> ModBus Communication between MSE and Customer PLC	
<i>Dokumentname / document name</i> AN200312 AE6 V63x ModBus Communication-1		

3.3.6 Analog Input Compensation

Register Name	Description	Register Number	Data Type	Access Type	Modbus Function
Ain_comp	Analog-in Compensation Status 0 - deactivated 1 - activated	3316	Int16	R/W	03,06,16
Ain_comp_ma_1	Analog-In Compensation Value (mA) Calib.Pt1	3317	Int16 FP1	R/W	03,06,16
Ain_comp_ma_2	Analog-In Compensation Value (mA) Calib.Pt2	3318	Int16 FP1	R/W	03,06,16
Ain_comp_ma_3	Analog-In Compensation Value (mA) Calib.Pt3	3319	Int16 FP1	R/W	03,06,16
Ain_comp_ma_4	Analog-In Compensation Value (mA) Calib.Pt4	3320	Int16 FP1	R/W	03,06,16
Ain_comp_ma_5	Analog-In Compensation Value (mA) Calib.Pt5	3321	Int16 FP1	R/W	03,06,16
Ain_comp_factor_1	Analog-In Compensation Factor Calib.Pt1	3322	Int16 FP2	R/W	03,06,16
Ain_comp_factor_2	Analog-In Compensation Factor Calib.Pt2	3323	Int16 FP1	R/W	03,06,16
Ain_comp_factor_3	Analog-In Compensation Factor Calib.Pt3	3324	Int16 FP1	R/W	03,06,16
Ain_comp_factor_4	Analog-In Compensation Factor Calib.Pt4	3325	Int16 FP1	R/W	03,06,16
Ain_comp_factor_5	Analog-In Compensation Factor Calib.Pt5	3326	Int16 FP2	R/W	03,06,16

Funktionsbeschreibung / Application Note		
<i>Produkt / product</i> MSE 300 AE6.3x	<i>Kurzbeschreibung / short description</i> ModBus Communication between MSE and Customer PLC	
<i>Dokumentname / document name</i> AN200312 AE6 V63x ModBus Communication-1		

4 Important Notes

4.1 Parameter Table Changes

- Changes in Parameter Table will get into effect only by writing to Register Param_WR_FLAG

4.2 Calibration Table Changes

- Changes in Calibration Table will get into effect only by writing to Register Calib_WR_FLAG

4.3 ModBus Package Length

- Maximum Length of a data package (inclusive Header, CRC/LRC) is limited to 256 Bytes!
- Received packages with more than 256 Bytes are ignored!
- Requested packages with more than 256 bytes are stripped-down to 256 Bytes!