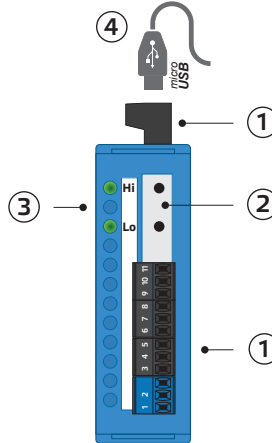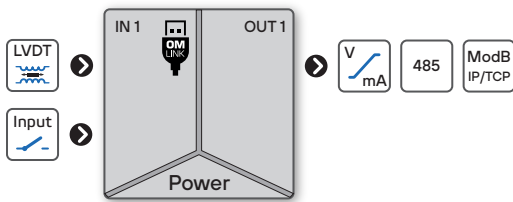# 1 Description

- **Power supply of LVDT sensor 1 / 3 / 5 Vac**
- **3- / 4- / 5- / 6-wire connection**
- **Data output Modbus TCP/IP**
- **Quick configuration by DIP switch**
- **PC configurable via USB port**
- **Galvanic isolation 2.5 kVAC**
- **Simple instalation to DIN rail**

OM LINK

OMX 390LVDT

Digital DIN rail mounted signal conditioner

INPUT FOR LVDT SENSORS

LED Indication

Hi	Lo	Status
🟢		Device is running
✳		Device functionality is limited, powered via USB
🟡		This device has a Delayed Start option
🔴		Error: device is out of order
🟢	⚪	Tare function is activated
🟢	🔴	Error: of input (> ±110% of range) or of sensor [ERR.1- 2]
🟢	🩷	Error: AO loop open [ERR.10]
🔴	🔴	Error: setting / calibration [ERR.34-36]
✳	✳	Serious error (Safe mode) [ERR.50]
✳	✳	Button function is blocked
🟢	🟡	Simulation mode is activated

Legend
① Connectors
② Control button
③ RGB Status LED
④ microUSB port for PC connection

⚡ DANGER ⚡	⚠ WARNING ⚠
HAZARD OF ELECTRICAL SHOCK - Disconnect all power and other supply lines before servicing equipment	**EQUIPMENT OPERATION HAZARD** - Do not use this product in safety critical system - Do not disassemble, repair or modify this product - Do not operate beyond the recommended operating environment
Failure to follow this instruction may result in death or serious injury.	Failure to follow these instructions may result in death, serious injury, or equipment damage.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by ORBIT MERRET for any consequences arising out of the use of this device.

2 Connection
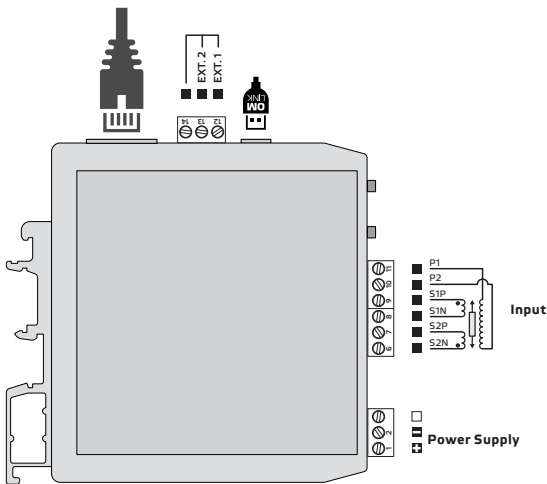
Note
Contactors, high power electric motors, frequency drives and other power devices should not be in a close proximity of the meter. Input signal leads (measured value) should be seperated from all power lines and power devices. Even though the device has been designed and tested according to standards for industrial environment, we strongly advise to adhere to the above presented rules.
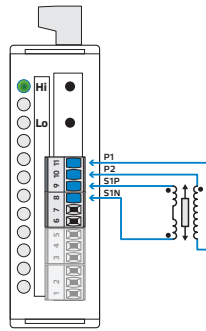
	0,05…1,5 mm² 30…16 AWG		8 0.32
	Ø 3,5 mm Ø 0.14 in		1,5 Nm 13.2 lb-in

Wiring diagram
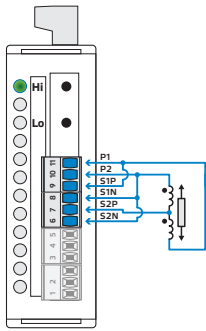
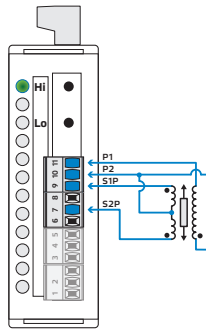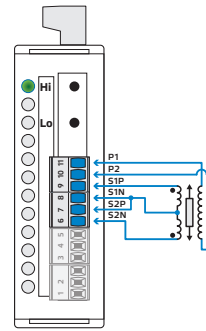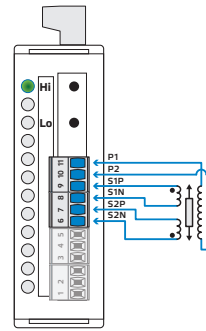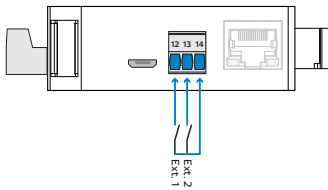**Input - LVDT [3-wire]**   **Input - LVDT [4-wire]**   **Input - LVDT [4-wire]**   **Input - LVDT [5-wire]**   **Input - LVDT [6-wire]**

Input - External inputs

> **i** Control of external inputs is via contact (voltage-free)

---

3 Device setting

DIP switch

For a quick set up you can use the DIP switch. Changing a configuration only takes effect after power off/on.

1	2	Sensor connection
		Working Mode includ. Teach-IN, Tara (default)
●		3-wire
	●	4-wire (default)
●	●	5-wire

6-wire connected is only selectable via the OM Link SW

3	4	5	Rate [measurements/s]
			50
●			300
	●		400
●	●		400 - FFT
		●	1200
●		●	2400
	●	●	4800
●	●	●	7200 (default)

6	7	8	Data output
			Modbus TCP/IP (defaulf)

Analog input range setting, TEACH-IN

1. Enter the teach-IN mode by a short press of the **Lo** button - LED **Hi** ☀ yellow and LED **Lo** ● turquoise
2. Put the connected sensor in the position that shall have minimum output **RNG.MIN** (for example 0.02 mV)
3. Set the minimum output value by a long press (>2 s) of the **Lo** button - LED **Hi** ☀ yellow, LED **Lo** ● purple
4. Put the connected sensor in the position that shall have maximum output **RNG.MAX.** (for example 20.01 mV)
5. Set the maximum output value by a long press (>2 s) of the **Lo** button - LED **Hi** ☀ yellow, LED **Lo** ● green
6. Leave teach-IN mode by a short press of the **Lo** button and return to the standard working mode - LED **Hi** ● green

The teached measuring range is non volatile and retained even after power off/on

> **i** Setting of **Analog input TEACH-IN** is active only when DIP switches No. 1-2 are in the "0" position, i.o. **Setting via OM Link**

> **i** In order to avoid possible unintended changes to settings by accidentally pressing the **Hi** and **Lo** buttons, these buttons can be **disabled** by connecting **terminals No. 12** and **14** of external inputs EXT.1 (wire jumper).

Zero settings (Tare)

1. Enter the tare mode by a short press of the **Hi** button - LED **Hi** ❋ white and LED **Lo** ● turquoise
2. Put the connected sensor in the position where the tare function shall be executed
3. Set the tare by a long press (>2s) of the **Hi** button - LED **Hi** ❋ white, LED **Lo** ● green
4. Leave tare mode by a short press of the **Hi** button - LED **Hi** ● green, LED **Lo** ○ white

The tare is always reset automatically when the device is switched off.

Offset settings, Teach-In

1. Enter the Teach-in for Offset mode by a long press of the **Hi** button - LED **Hi** ❋ white and LED **Lo** ☀ turquoise
2. Put the connected sensor in the position where the Offset function shall be executed
3. Set the Offset by a long press (>2s) of the **Hi** button - LED **Hi** ❋ white, LED **Lo** ● green
4. Leave Offset mode by a short press of the **Hi** button - LED **Hi** ● green

> **i** A short press at any time during the calibration will end the calibration without saving. After one minute of inactivity, the calibration is terminated without saving and both LEDs return to the basic state.

Description of Modbus registers

The new device protocol supports reading and writing multiple registers at the same time. Each register is 2 bytes in size. Values of type float32 are stored in two registers (4 bytes).

You can find a detailed description of the protocol on our website
Modbus Protocol Registry Application Sheet
https://www.orbitmerret.eu/cs/document-download?document_id=13642

4 Configuration from PC using OM Link SW

Inputs

Label	Code		Options	Description		Teach-in flow	
Reset of Tare	CLEAR	›	CL.TAR.	Tare resetting			
Sampling rate	READ. S.	›	1 2.5 5 10 25 50 100	Measuring rate selection			
Sensor power supply	POWER	›	1V-2.5k 1V-5k 1V-10k 3V-2.5k 3V-5k 3V-10k 5V-2.5k 5V-5k 5V-10k	Selection of LVDT sensor power supply			
Gain	GAIN	›	1 2 4 8	Selection of signal amplification from LVDT sensor			
Sensor connection	CONNEC.	›	3-wire 4-wire 5-wire 6-wire	Selection of the LVDT sensor connection type			
Offset, Teach-in	M.RANGE	›	YES	Offset setting (shift "0") in learning mode		T-IN.LO	Device measures the value of the Lo signal
Offset	T-IN.OF.	›	0…9999	Setting the offset value ("0")		YES	Lo signal connection confirmed
Setting of converted value	OFFSET	›	-99999…0…999999	For the minimum of the selected input range		T-IN.HI	Device measures the value of the Hi signal
	RNG.MIN.	›	-99999…20…999999	For the maximum of the selected input range*		YES	Hi signal connection confirmed
Input setting Expert	RNG.MAX.	›	T-IN.LO T-IN.HI	Setting the input range in the Teach-in mode		MAN. LO	Manual entry of Lo input signal for MIN
	TEACH-IN	›	MAN. LO MAN. HI	Setting the input range in the Manual mode		0.02	Entry of signal value (example: 0.02 V)
Digital filters	MANUAL	›	OFF AVERAG. FL. AVG. EXPON. ROUND.	Filters for math. adjust. of the input signal		MAN. HI	Manual entry of Hi input signal for MAX
Filter constant	F.MODE	›	0…9999	Setting the constant for the filter		2.991	Entry of signal value (example: 2.991 V)
External input	F.CONST.	›	OFF TARE CL.TAR. TAR.-CL. CUM.SUM. T-IN.OF. HOLD SAMPLE HLD.MIN HLD.MAX HLD.M-M HLD.PRM. KEY.LCK.	Fce selection EXT. 1			
	EXT.IN.1	›	OFF TARE CL.TAR. TAR.-CL. CUM.SUM. T-IN.OF. HOLD SAMPLE HLD.MIN HLD.MAX HLD.M-M HLD.PRM. KEY.LCK.	Fce selection EXT. 2			
	EXT.IN.2	›					

Function

Label	Code		Options	Description		Type	Description	Equation
Mathematical function	INP. M.F.	›	OFF INPUT INP.FIL. INP.ABS.	Input selection for the math function		POLYN.	Polynomial	$Ax^5 + Bx^4 + Cx^3 + Dx^2 + Ex + F$
	TYPE.M.F.	›	POLYN. IN. POL. LOGAR. EXPON. POWER SQ.ROOT			IN. POL.	Inv. polynomial	$\frac{A}{x^5} + \frac{B}{x^4} + \frac{C}{x^3} + \frac{D}{x^2} + \frac{E}{x} + F$
	CONST. A … F	›	0…99	Setting constants for mathematical functions		LOGAR.	Logarithmic	$A \times \ln\left(\frac{Bx+C}{Dx+E}\right) + F$
Linearization table	INP. L.T.	›	OFF INPUT FILTER.	Input selection for the linearization table		EXPON.	Exponential	$A \times e^{\left(\frac{Bx+C}{Dx+E}\right)} + F$
	N.OF.PTS.	›	5…100	Number of points in the table		POWER	Power	$A \times (Bx+C)^{(Dx+E)} + F$
	VALUES	›	-9999…99999	Values of X/Y		SQ.ROOT	Square root	$A \times \sqrt{\frac{Bx+C}{Dx+E}} + F$

Output

Label	Code		Options	Description
Modbus TCP/IP	DHCP	›	YES NO	Selection of assigning IP addresses
	IP.ADR.	›	192.168.88.40	IP Address setting (IPv4)
	MASK	›	255.255.255.0	Subnet Mask setting
	GATE	›	192.168.88.1	Default Gateway setting
	PORT	›	1…502…65535	Port setting

Service

Label	Code		Options	Description
Setting of password	PASSW.	›	0…9999	Password to connect the device to PC. If it is set to "0", access is not blocked
Delayed Start	DLY.STR.	›	0…99	Setting the time [sec.] - when the measurement is not performed after powering the device on
Save user settings	SAV.SET.	›	YES	Saves the current device settings
Load user settings	LOA.SET.	›	YES	Loads the user settings into the device
Factory reset	FACT.ST.	›	YES	Loads the original factory settings, restores the initial settings (*BLUE TEXTS*)
Erase user calibration	CLR.CAL.	›	YES	Clears user calibration, restores factory calibrations (after user calibration by script via OM Link SW had been performed)
Key lock	KEY.LCK.	›	ON OFF	Disables the push button(s) on the front panel of the device
Error selection for signalling	SIG.ERR.	›	ERR 1 ERR 2 ERR 20 ERR 21 …	Errors that will be signalled on the selected output
Simulation of input signal	SIM.MIN.	›	MIN › -99999…0…99999	Setting the start of the range for simulation
	SIM.MAX.	›	MAX › -99999…100…99999	Setting the end of the range for simulation
	STEP	›	-99999…1…999999	Setting of increment/step value
	TIME	›	0…100…999.9	Setting the increment/step duration time [sec.]
	START	›	STOP YES	Start of simulation
	STOP	›	START YES	Stop of simulation

Error messages

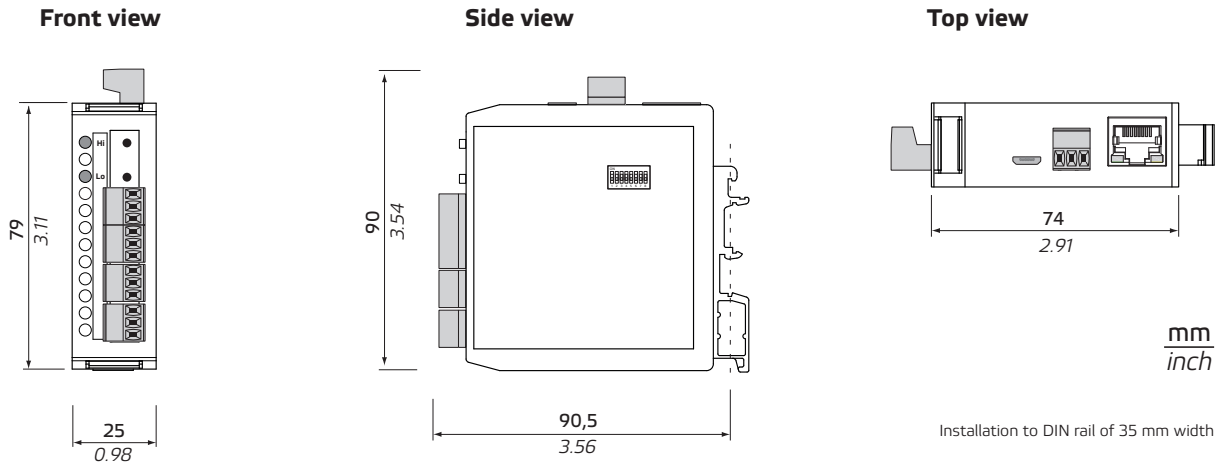| Error	Error description	Solution
ERR 1	Input range exceeded by ±10% or more.	Change input signal value or input setting (range).
ERR 2	AD converter overflow / underflow.	Change input signal value or input setting (range).
ERR 20	Math function error.	Change math function settings.
ERR 21	Linearization table error.	Change/complete the settings of the linearization table.
ERR 30	Powered only by USB, analog circuits inactive.	Connect power supply to the device (clamp 1,2).
ERR 34	User configuration could not be loaded from EEPROM. Default configuration automatically applied.	Repeat device configuration. If message is shown repeatedly, send the device for repair.
ERR 35	Factory calibration has been lost. Converter's accuracy is compromised up to ±5%	When this error occurs, send the device for re-calibration or upload factory calibration data.
ERR 36	User calibration could not be loaded from EEPROM. Factory calibration automatically applied.	Repeat the user calibration. If message is shown repeatedly, send the device for repair.
ERR 50	Serious device error - damaged EEPROM. The device operates in an emergency mode, i.e. settings cannot be changed. Measurement error can be up to 5%	Send the device for repair.

Errors ERR 34-50 are displayed permanently, until they are corrected.

⚠ The USB connector is galvanically connected to the input! USB-to-USB Isolator must be used when input signal is connected to the device. **DANGER OF COMPUTER DAMAGE**

Front view

79
3.11

25
0.98

Side view

90
3.54

90,5
3.56

Top view

74
2.91

mm
inch

Installation to DIN rail of 35 mm width

6   Technical data

INPUT

No. of inputs	1
Setting	Dual 24-bit ΔΣ ADC with PGA with demodulator and wake-up signal generator
	The range is selectable either by DIP switch or by OM Link free SW from PC
LVDT Sensor power supply	1, 3 or 5 VAC with frequency 2.5, 5 or 10 kHz
Preamplifier gain	1, 2, 4 or 8
Connection	3-, 4-, 5- or 6-wire

EXTERNAL INPUT

No. of inputs	2, on contact	
Function	OFF	No function assigned
	TARE	Activation of Tare
	CL.TAR.	Clear Taree
	TAR.-CL.	Activat. of Tare (<1 s) + clear Tare (>1 s)
	T-IN.OF.	Activation of Tech-In for Offset
	CUM.SUM.	Control of Cumulative measurement
	HOLD	Measurement paused
	SAMPLE	Initiates a one-off measurement
	HLD.MIN	Hold - Value of Minimum*
	HLD.MAX	Hold - Value of Maximum*
	HLD.M-M	Hold - Value of MAX-MIN*
	HLD.AVG	Hold - Average value*
	KEY.LCK.	Device buttons blocked

*The value is calculated from the period starting with the previous external input activation.

INSTRUMENT SPECIFICATION

TC	25 ppm/ºC
Accuracy	±0.1% of FS
Rate	1…100 measurements/s
Latency	< 580 µs
Overload	10x (t < 30 ms), 2x
Functions	Teach-in, tare, offset, min/max value, math. functions, delayed start, simulation
Weighing functions	automatic zero tracking, automatic tare, setting of scale division (0.001…100)
Digital filters	exponential / floating / arithmetic average, ouding
Math functions	polynomial / inverse polynomial / logarithm / exponential / power / root
Linearization	linear interpolation in 100 points *only via OM Link*
OM Link	company communication interface for operation, setting and update of instruments. (microUSB)
Watch-dog	reset after 500 ms
Calibration	at 25ºC and 40 % r.h.

DATA OUTPUT

o. of outputs	1
Type	10/100BaseT
Protocol	Modbus TCP/IP (Slave)
Rate	100 Mbit/s.
Setting	DHCP IPv4 Address Subnet Mask Default Gateway Port

POWER SUPPLY

Power	10…30 VDC/24 VAC, ±10 %, PF ≥ 0.4, I_{STP}< 40 A/1 ms, isolated *Fuse inside (T500mA)*
Consumption	< 3.4 W / 3.3 VA < 5.0 W / 4.9 VA (at 80 Ω load)

MECHANIC PROPERTIES

Material	PA66, incombustible UL 94 V-0, green
Dimensions	25 x 79 x 90.5 mm (w x h x d)
Installation	to DIN rail 35 mm wide

OPERATING CONDITIONS

Connection	connector terminal blocks, section < 1.5 mm²
Stabilization period	within 5 minutes after switch-on
Working temp.	-20º…60ºC
Storage temp.	-20º…85ºC
Working humidity	< 95 % r.h., non condensing
Protection	IP20
Construction	safety class I
El. safety	EN 61010-1, A2
Dielectric strength	2.5 kVAC for 1 min. between power supply and signal input 2.5 kVAC for 1 min. between signal input and outputs
Insulation resistance*	for pollution degree II, measurement cat. III power supply > 300 V (PI), 255 V (DI) Input/outputs > 300 V (PI)
EMC	EN 61326-1 (Industrial area)
RoHS	EN IEC 63000:2018
Seismic qualification	IEC/IEEE 60980-344 ed. 1.0:2020, par. 6, 9
Mechanical resistance	EN 60068-2-6 ed. 2:2008

* PI - Primary insulation, DI - Double insulation

CE   UK CA   EAC   RoHS compliant

Measuring instruments of the OMX 390LVDT series conform to the European regulation 2014/30/EU, 2014/35/EU and 2011/65/EU, 2015/863/EU.

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations.
As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.