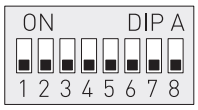
Modbus

S+S REGELTECHNIK

Bus address (DIP A) in binary format



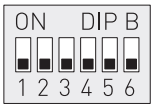
DIP switch [A] for setting the bus address:

Bus address (binary coded, value selectable from 1 to 247)							
DIP 1	**DIP 2**	**DIP 3**	**DIP 4**	**DIP 5**	**DIP 6**	**DIP 7**	**DIP 8**
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**
ON	**ON**	OFF	OFF	OFF	OFF	OFF	**ON**

Example shows
128 + 64 + 1 = 193
as Modbus address.

DIP switch

1		51		101		151		201	
2		52		102		152		202	
3		53		103		153		203	
4		54		104		154		204	
5		55		105		155		205	
6		56		106		156		206	
7		57		107		157		207	
8		58		108		158		208	
9		59		109		159		209	
10		60		110		160		210	
11		61		111		161		211	
12		62		112		162		212	
13		63		113		163		213	
14		64		114		164		214	
15		65		115		165		215	
16		66		116		166		216	
17		67		117		167		217	
18		68		118		168		218	
19		69		119		169		219	
20		70		120		170		220	
21		71		121		171		221	
22		72		122		172		222	
23		73		123		173		223	
24		74		124		174		224	
25		75		125		175		225	
26		76		126		176		226	
27		77		127		177		227	
28		78		128		178		228	
29		79		129		179		229	
30		80		130		180		230	
31		81		131		181		231	
32		82		132		182		232	
33		83		133		183		233	
34		84		134		184		234	
35		85		135		185		235	
36		86		136		186		236	
37		87		137		187		237	
38		88		138		188		238	
39		89		139		189		239	
40		90		140		190		240	
41		91		141		191		241	
42		92		142		192		242	
43		93		143		193		243	
44		94		144		194		244	
45		95		145		195		245	
46		96		146		196		246	
47		97		147		197		247	
48		98		148		198			
49		99		149		199			
50		100		150		200			



DIP switch [B] for setting bus parameters:

Baud rate (selectable)	DIP 1	DIP 2
9600 baud	**ON**	OFF
19200 baud	**ON**	**ON**
38400 baud	OFF	**ON**
Reserved	OFF	OFF

Parity (selectable)	DIP 3
EVEN (numbered)	**ON**
ODD (numbered)	OFF

Parity check (on/off)	DIP 4
Active (1 stop bit)	**ON**
Inactive (no parity) (2 stop bits)	OFF

8N1 mode (on/off)	DIP 5
Active	**ON**
Inactive (default)	OFF

Bus termination (on/off)	DIP 6
Active	**ON**
Inactive	OFF

BUS ADDRESS

The device address in the range of **1 to 247** is set at DIP switch [A].
For switch positions 1 to 8 see the table on the back!

Address 0 is reserved for broadcast messages. Addresses greater than 247 must not be assigned and are ignored by the device.
The DIP switches are binary-coded with the following values:

DIP 1 = **128** ..... DIP 1 = **ON**
DIP 2 = **64** ..... DIP 2 = **ON**
DIP 3 = 32 ..... DIP 3 = OFF
DIP 4 = 16 ..... DIP 4 = OFF
DIP 5 = 8 ..... DIP 5 = OFF
DIP 6 = 4 ..... DIP 6 = OFF
DIP 7 = 2 ..... DIP 7 = OFF
DIP 8 = **1** ..... DIP 8 = **ON**

The switch positions shown here result in the Modbus address **128 + 64 + 1 = 193**

BUS PARAMETERS

The baud rate (speed of transmission) is set at DIP switches 1 and 2 of DIP switch block [B].
Selectable are **9600 baud, 19200 baud**, or **38400 baud** – see table!

Parity is set at DIP switch 3 of DIP switch block [B].
Selectable are **EVEN** or **ODD** – see table!

Parity check is activated via DIP switch 4 of DIP switch block [B].
Selectable are **active (1 stop bit)**, or **inactive (2 stop bits)**, i.e. no parity check – see table!

The **8N1 mode** is activated via DIP switch 5 of DIP switch block [B].
The functionality of DIP switch 3 (parity) and DIP switch 4 (parity check) of DIP switch block [B] is therefore deactivated.
Selectable are 8N1 **active** or **inactive (default)** – see table!.

Bus termination is activated via DIP switch 6 of DIP switch block [B].
Selectable are **active** (bus termination resistance of 120 Ohm), or **inactive** (no bus termination) – see table!

When bus parameters and bus address are changed at devices with **display**,
the respective settings are shown on the display for approx. 30 seconds.

COMMUNICATION INDICATOR

Communication is indicated via two LEDs.
Error-free received telegrams are signalized by the green LED lighting up, regardless of the device address.
Faulty telegrams or triggered Modbus exception telegrams are depicted by the red LED lighting up.

DIAGNOSTICS

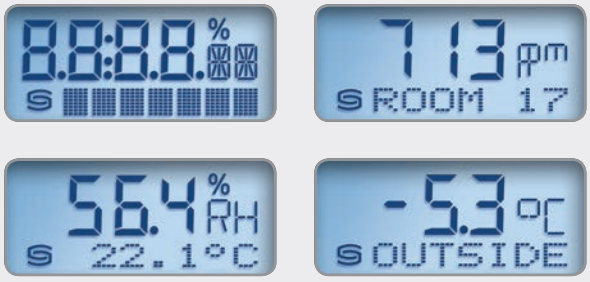
An error diagnostic function is integrated.

Modbus

S+S REGELTECHNIK

Display individually programmable via Modbus interface

Display (Baldur)
Symbols and display examples



Alternative parameters
Display programmable via index



Display (Tyr 2)
Symbols and display examples



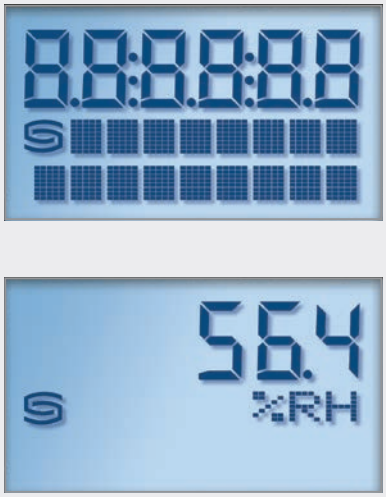
Individually programmable display area for two or three-line displays

Our displays can be controlled via the Modbus interface.
This means that messages such as those from the PLC can also be displayed.

All characters in the display can be individually described both in the 7-segment area, and in the dot matrix area.

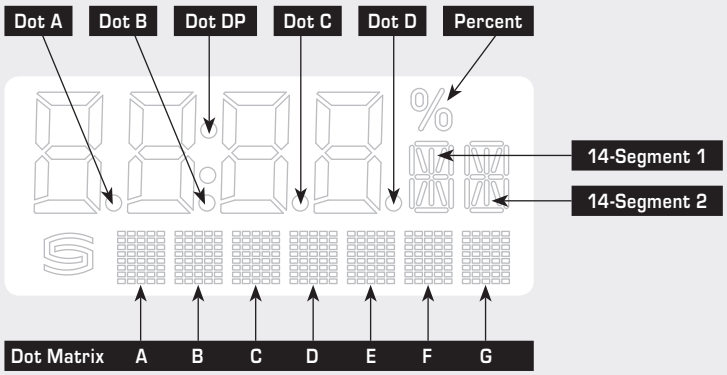
Depending on the device type, it is also possible to display alternative parameters such as absolute humidity, dew point, mixture ratio or enthalpy instead of the standard display.

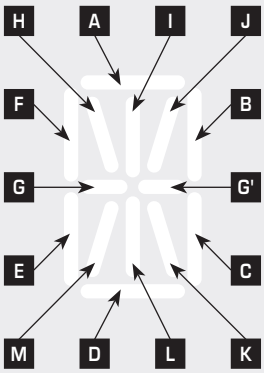
Display (Tyr 3)
Symbols and display examples



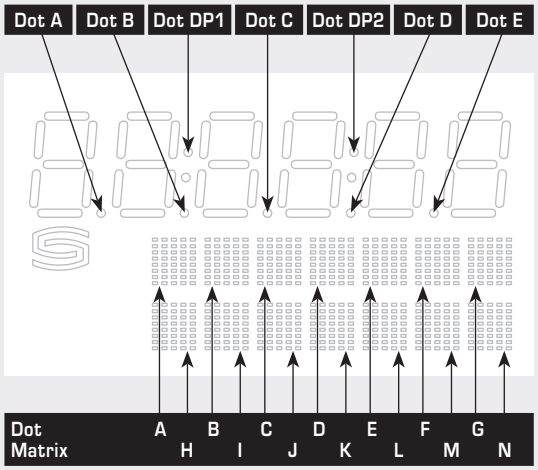
Composition of segment patterns

Display (Baldur)
two-line, cut-out approx. 36 x 15 mm

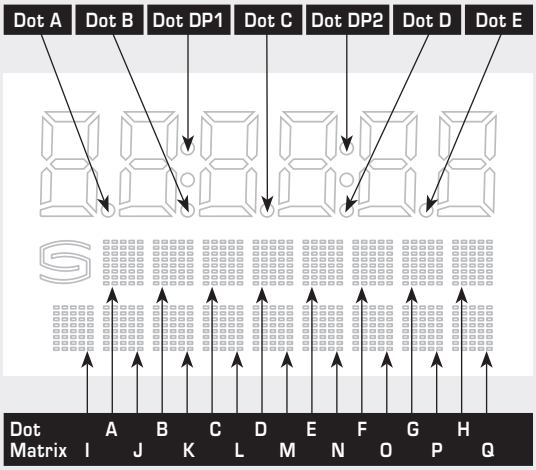




Display (Tyr 2)
three-line, cut-out approx. 70 x 40 mm



Display (Tyr 3)
three-line, cut-out approx. 51 x 29 mm



Representable characters in the dot matrix display area for two- and three-line displays

ASCII characters or control characters are displayed as spaces.

ASCII	Sign
32	Blank
33	!
34	“
35	#
36	$
37	%
38	&
40	(
41	)
42	*
43	+
44	,
45	-
46	.
47	/

ASCII	Sign
48	0
49	1
50	2
51	3
52	4
53	5
54	6
55	7
56	8
57	9
58	:
59	;
60	<
61	=
62	>

ASCII	Sign
63	?
64	@
65	A
66	B
67	C
68	D
69	E
70	F
71	G
72	H
73	I
74	J
75	K
76	L
77	M

ASCII	Sign
78	N
79	O
80	P
81	Q
82	R
83	S
84	T
85	U
86	V
87	W
88	X
89	Y
90	Z
91	[
93	]

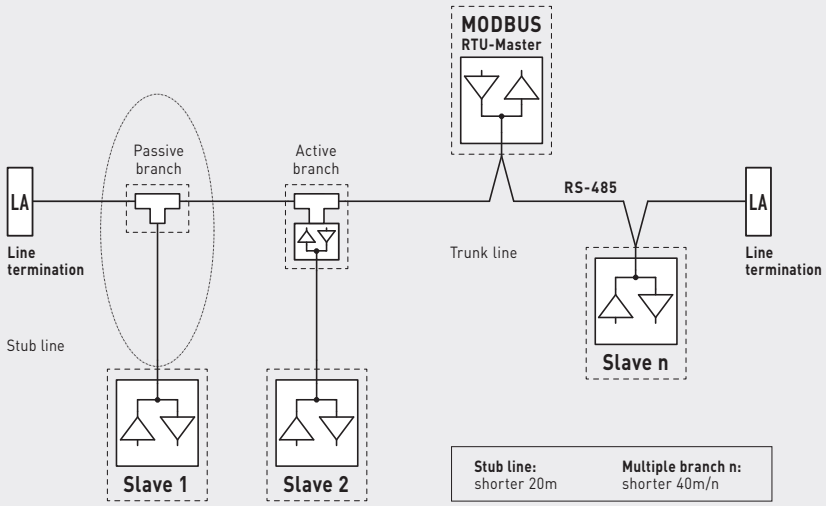
ASCII	Sign
94	^
95	_
96	\
97	a
98	b
99	c
100	d
101	e
102	f
103	g
104	h
105	i
106	j
107	k
108	l

ASCII	Sign
109	m
110	n
111	o
112	p
113	q
114	r
115	s
116	t
117	u
118	v
119	w
120	x
121	y
122	z
123	{

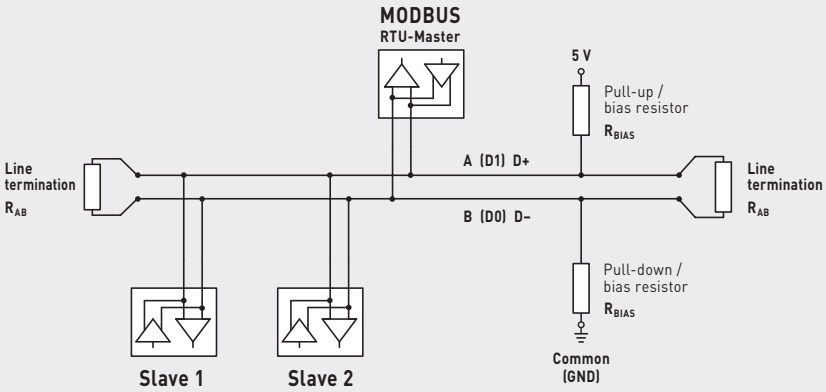
ASCII	Sign
124	|
125	}
129	ü
132	ä
142	Ä
148	ö
153	Ö
154	Ü
223	°

General layout of bus structure and bus topology with terminating and bias resistors

General layout of bus structure



Bus topology with terminating and bias resistors

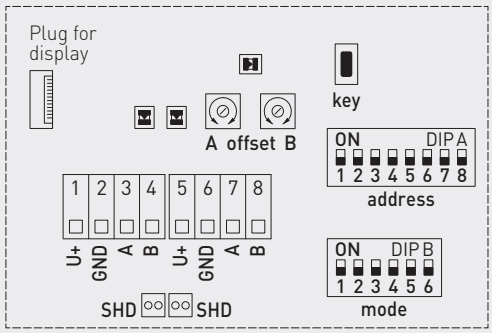


Terminating resistor may only be installed at the ends of the bus line.
In networks with repeaters not more than two line terminations are allowed.
Line termination at the device can be activated via DIP switch 6.
The bias resistors for bus level definition in the resting state are usually activated at the Modbus master / repeater.

The maximum number of subscribers per Modbus segment is 32 devices.
When the number of subscribers is greater, the bus must be subdivided into several segments separated by repeaters. The subscriber address can be set from 1 to 247.

For the bus line, a twisted-pair cable data line / power supply line and copper mesh wire shield must be used. Therefore, the line capacitance should be less than 100 pF/m (e.g. Profibus cable).

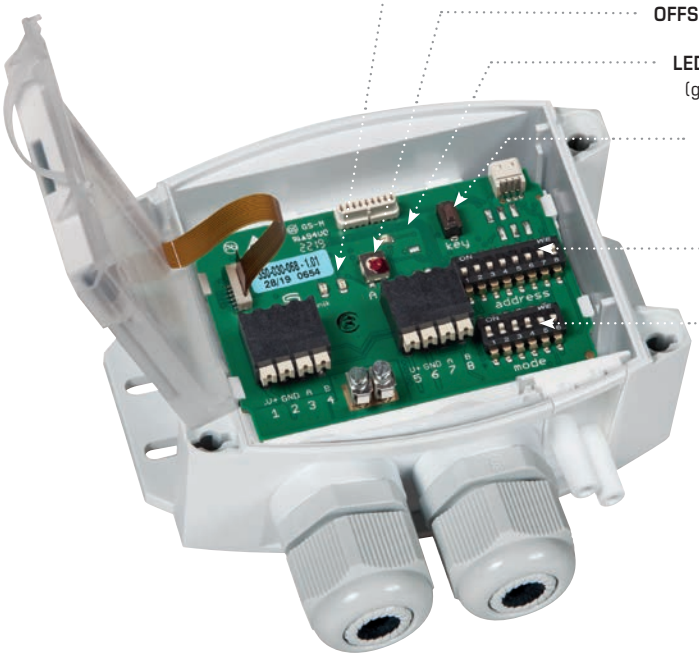
Sensors (Tyr3) — **Modbus** (RTU cable)



DIP A: Bus address
DIP B: Bus parameters (Baud rate, parity...)
Telegram indicator Reception (LED green) Error (LED red)
LED (internal status)
Offset correction
Button „**key**" (auto zero)
Shielding

TECHNICAL DATA

Power supply:	24 V AC (± 20 %); 15...36 V DC
Power consumption:	< 1 W / 24 V DC; < 1.6 VA / 24 V AC
Electrical connection:	see schematic diagram 0.2 - 1.5 mm², via push-in terminals
Bus parameters:	**without power supply** (in powerless mode) **configurable and addressable** via DIP switch!
Bus interface:	RS 485, **galvanically isolated,** Bus termination activatable via DIP switches. Up to 32 devices possible in one segment. In case of a greater number of devices, RS485 transceivers must be used.
Bus protocol:	Modbus (RTU mode), address range 0...**247** selectable
Baud rate:	9600, 19200, 38400 Baud
Status indicator:	LED green = Telegram valid LED red = Telegram error
Display:	The Modbus interface allows the display to be **individually** configured both in the 7-segment area and in the dot-matrix area.



2 separate **plug terminals** (push-in terminals)

OFFSET correction

LED for telegram indication (green for reception , red for error)

Push-button for manual zero point calibration

DIP switches block A for bus address

DIP switches block B for bus parameters



Foldable **display** (optional), Individually programmable display

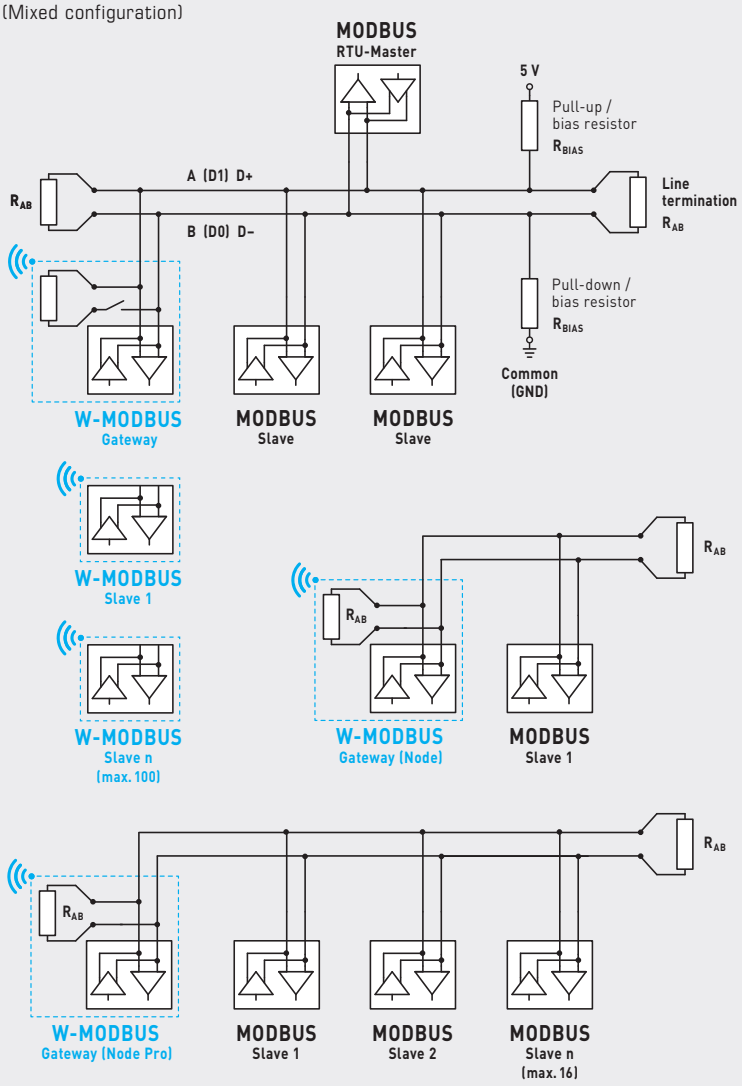
2 separate **cable glands** (M20) with seal and strain relief

W-Modbus

General bus topology structure
with terminating and bias resistors
(mixed configuration with W-Modbus gateway)

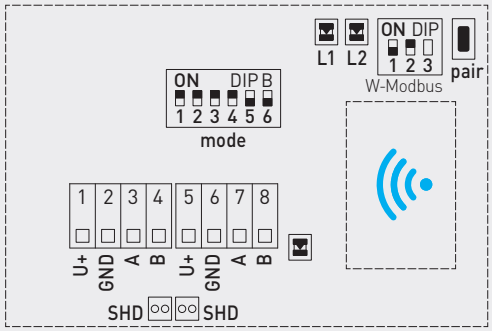
S+S REGELTECHNIK

Bus topology with terminating and bias resistors
(Mixed configuration)



Gateway
(Tyr3)

GW-wModbus
(Wireless)



DIP B „mode“:
Bus parameters
(Baud rate, parity...)

DIP „W-Modbus“:
Operating Mode
(Gateway, Node)

Telegram Status (LED)

Network Status (L1) Connection quality (L2)
L1 L2

Shielding (SHD)

Teach-in key (pair)

Various functions of the W-Modbus gateway:

Gateway operation for connection to an existing Modbus topology or directly to a DDC, serves as a base station for W-Modbus sensors (max. 100 radio nodes).

Node operation enables the radio-based connection of a wired Modbus sensor to a W-Modbus network (max. 1 wired sensor).

Node Pro operation (extended node operation) serves for the radio-based connection of multiple wired Modbus sensors (max. 16 wired nodes).

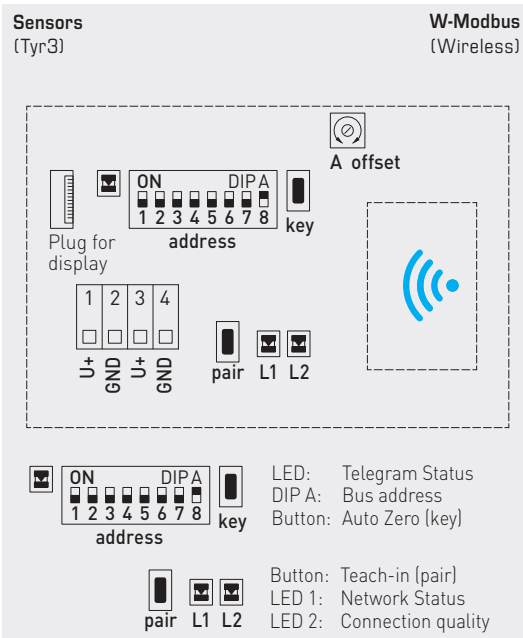
The **W-Modbus protocol** is based on the (2.4 GHz ISM radio band) and employs a patented frequency hopping technology to maximise reliability and resistance to interference. This means that reliable radio transmission can also be ensured in industrial environments.

In the **W-Modbus network** up to 100 nodes can communicate with each other over a long distance of up to 500 metres (open field) using one gateway.
A standardised W-Modbus module ensures compatibility with all W-Modbus units.

The **W-Modbus sensors** only need to be supplied with power.
Only the slave address is configured manually, the transmission parameters (baud rate and parity) are set automatically. No terminating resistor is required. The sensor is then paired with a gateway.

The **W-Modbus gateway** serves as a transition between wired Modbus and radio-based W-Modbus. Even mixed configurations of wired and radio-based Modbus units can be easily integrated into existing network topologies via the W-Modbus gateway.





TECHNICAL DATA

Power supply:	24 VAC (± 20 %); 15…36 VDC
Power consumption:	< 2 W / 24 VDC; < 3.5 VA / 24 VAC
Electrical connection:	see schematic diagram 0.2 - 1.5 mm², via push-in terminal
Bus address:	**without power supply** (in powerless mode) **configurable and addressable** via DIP switch!
Bus parameters:	automatic configuration
Communication:	**W-Modbus** (wireless Modbus with 2.4 GHz ISM, AES-128 encrypted)
Range:	**max. 500 m** (open field), approx. 50 - 70 m (inside buildings) between two wireless nodes
Nodes:	max. 100 radio nodes
Bus protocol:	Modbus (RTU mode), address range 0…**247** selectable
Status indicator:	Telegram Status, Network Status, Connection Quality
Display:	The Modbus interface allows the display to be **individually** configured both in the 7-segment area and in the dot-matrix area.

