

7.8.7 Certificates and approvals

Table 7- 25 6GT2810-2DC00 - RF640T Gen 2 UHF Tool Tag - Europe



Certificate	Description
	CE approval according to R&TTE guideline For Directive 94/9/EC: EC type test certification no. TÜV 07 ATEX 346241 Acknowledgement of the quality assurance TÜV 96 ATEX 1125 Q

Table 7- 26 6GT2810-2DC10 - RF640T Gen 2 UHF Tool Tag - USA/Canada

Standard	
FCC Federal Communications Commission	Passive labels or transponders comply with the valid regulations; certification is not required
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

7.8.7.1 Manufacturer's declaration RF640T Gen 2 UHF Tool Tag Version 1

The plant that manufactured the RF640T Gen 2 UHF Tool Tag Version 1 has an ATEX quality assurance system recognized by TÜV NORD with notification number TÜV 96 ATEX 1125 Q. The type test certification for the RF640T Gen 2 UHF Tool Tag Version 1 is stored by TÜV 07 ATEX 346241.

Manufacturer's address

Siemens AG
Automation and Drives
System Engineering A&D SE
Würzburger Strasse 121
90766 Fürth, Germany.

7.8.8 Dimension drawing

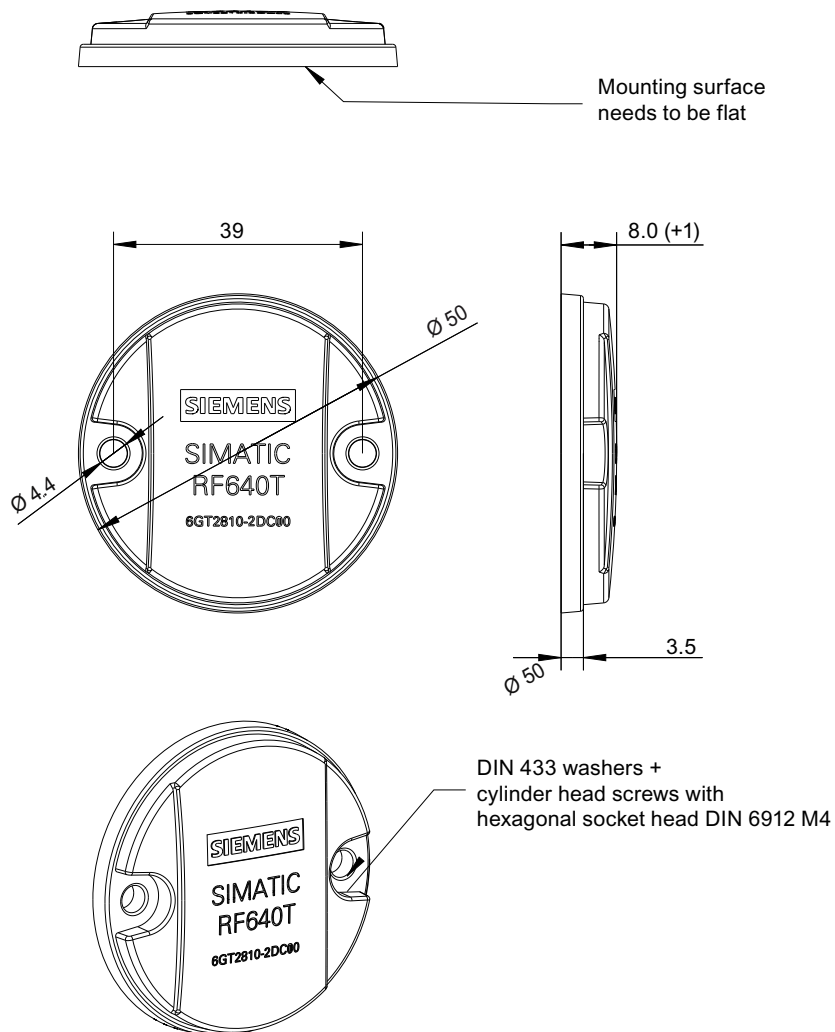


Figure 7-46 SIMATIC RF640T Gen 2 UHF Tool Tag Version 1

Units of measurement: All dimensions in mm

7.9 SIMATIC RF680T

7.9.1 Characteristics


The heat-resistant SIMATIC RF680T transponder is a passive, maintenance-free data carrier. It operates based on the UHF Class 1 Gen 2 technology and is used to save the "Electronic Product Code" (EPC) of 96 bits/240 bits. The transponder also has a 512-bit user memory.

These transponders with limited service life are ideally suited to high-temperature applications (e.g. the painting of vehicle bodies) as well as applications in production logistics.

The RF680T is rugged and suitable for industrial applications with IP68/IPX9K degree of protection.

It is highly resistant to oil, grease and cleaning agents.

The SIMATIC RF680T is mounted directly onto metal and non-metal carrier plates to ensure optimal operation and has a typical detection range of 4 m.

SIMATIC RF680T transponder	Features	
	Application	Applications with high temperatures (up to +220 °C) Typical application areas: <ul style="list-style-type: none"> • Paint shops and their preparatory treatments, incl. drying ovens • Electrophoretic deposition area • Primer coat incl. drying oven • Top coat area incl. drying oven • Washing areas at temperatures > 85 °C
	Frequency range	865 ... 928 MHz (ETSI and FCC)
	Air interface	according to ISO [®] 18000-6C
	Polarization	Linear
	Temperature range	up to 220 °C
	Memory	EPC 96 bit/240 bit Add-on-memory 64 bytes
	Reading / writing range	typically 3 m in conjunction with: <ul style="list-style-type: none"> • RF640R/RF670R reader and • RF660A antenna
		typically 3.6 m in conjunction with: <ul style="list-style-type: none"> • RF640R with integrated antenna
Typically 1.4 m/2 m in connection with: <ul style="list-style-type: none"> • RF620R/RF630R reader and • RF660A antenna 		

SIMATIC RF680T transponder	Features	
		Typically 1.4 m/2 m in connection with: <ul style="list-style-type: none"> RF620R with integrated antenna
	Installation	Suitable for direct mounting on conductive and non-conductive materials.
	Material	Plastic PPS; silicone-free
	Dimensions	130 x 32 x 15 mm

7.9.2 Ordering data

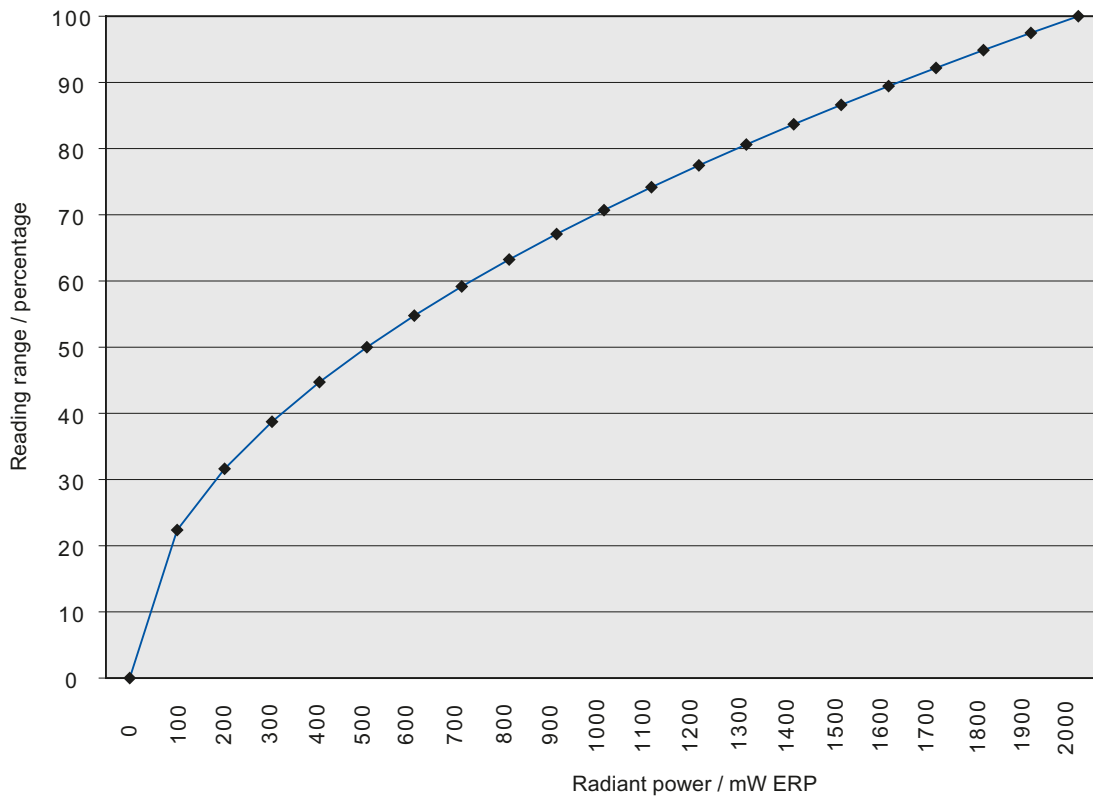
Ordering data	Order no.
SIMATIC RF680T <ul style="list-style-type: none"> Frequency 865 MHz to 928 MHz EPC 96 bit/240 bit (64 bytes user memory) -25 ... +220 °C 130 x 32 x 15 mm 	6GT2810-2HG80

7.9.3 Planning the use

The absolute values of the reading ranges specified below refer to a transmit power of 2 W ERP.

When the power is reduced (e.g. when a different reader is used), you will find the corresponding reduced reading ranges in the following table:

Relationship between radiant power and reading range



7.9.3.1 Reading range when mounted on non-metallic carriers

The RF680T transponder is a universal transponder for mounting on many different types of carrier plate materials.

Table 7- 27 Reading range for non-metal carriers (RF670R = 2 W ERP;)

Carrier plate material	Reading range for RF670R
Transponder on wooden carrier (dry, degree of moisture < 15%)	Typ. 4 m
Transponder on plastic carrier	Typ. 4 m
Transponder on glass	Typ. 4 m

100% reading range is achieved when mounted in empty, anechoic rooms.

7.9.3.2 Directional radiation pattern of the transponder on non-metallic surfaces

It is recommendable to align the transponder parallel to the transmitting antenna. If, however, the transponder including the metallic carrier plate is tilted, the reading range will be reduced.

Rotation about the polarization axis

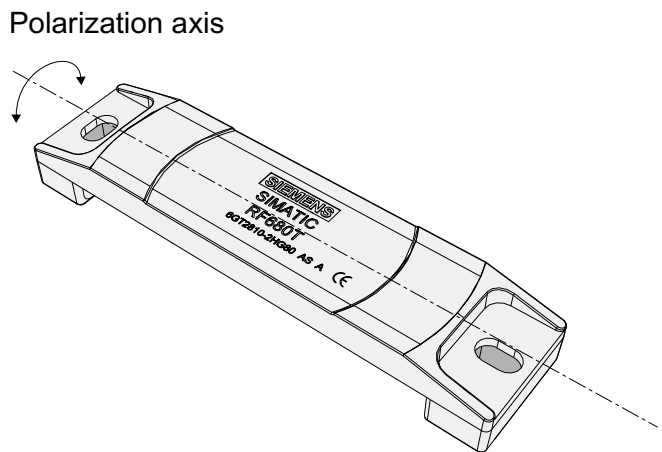


Figure 7-47 Rotation of the transponder about the polarization axis

Generally the range does not change when the transponder without carrier material is rotated about the polarization axis.

Rotation orthogonal to the polarization axis

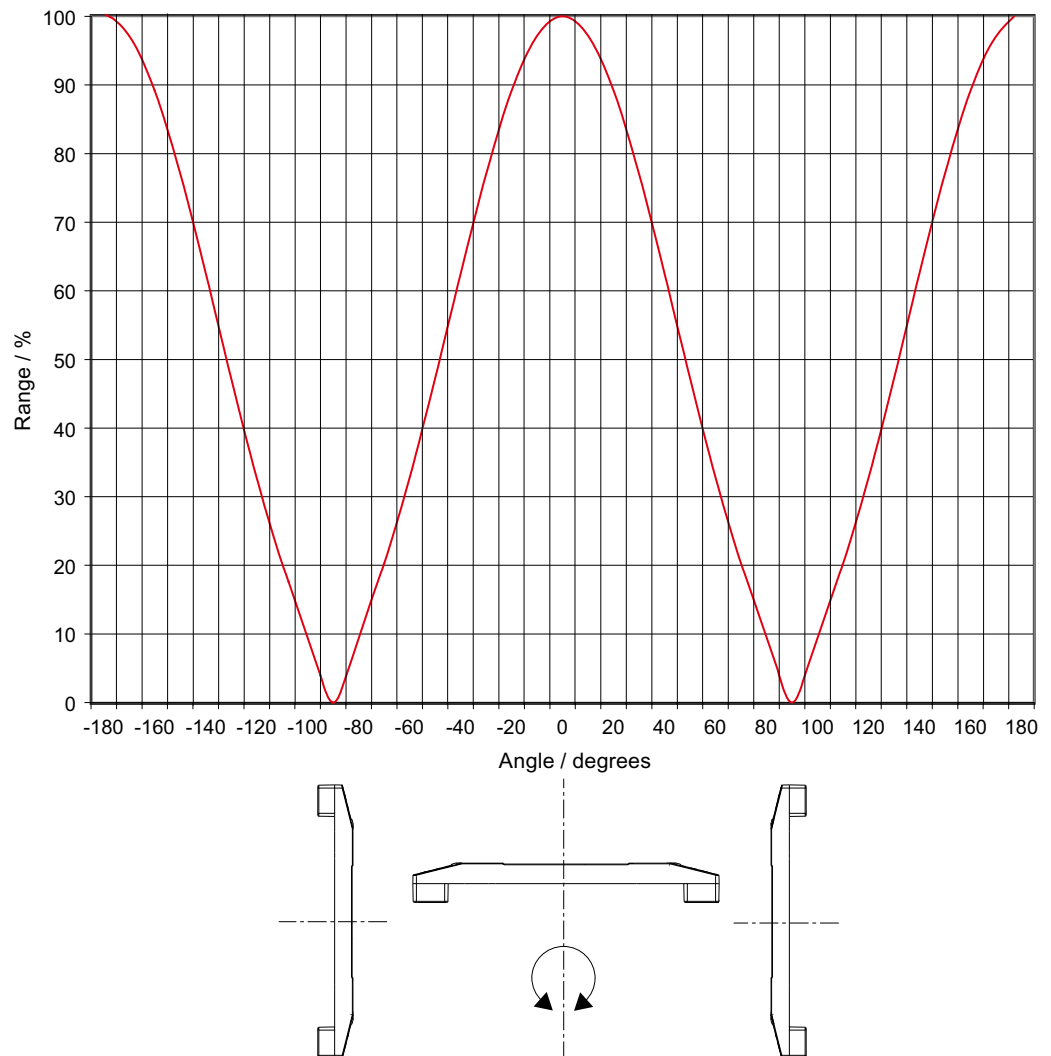


Figure 7-48 Transponder characteristics when rotated orthogonally to the polarization axis (within the tag plane)

If the transponder is positioned orthogonally to the transmitting antenna, it normally cannot be read. Therefore the transponder is preferably to be aligned parallel to the transmitting antenna. The following figure illustrates this situation.

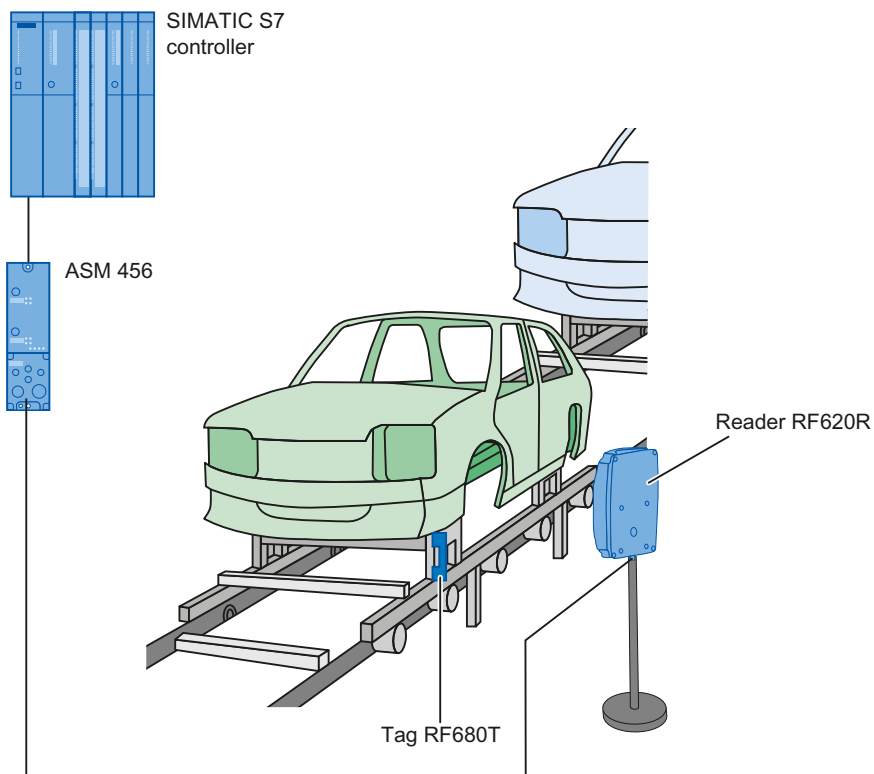


Figure 7-49 Application example

7.9.3.3 Optimum antenna/transponder positioning with plane mounting of the transponder on metal

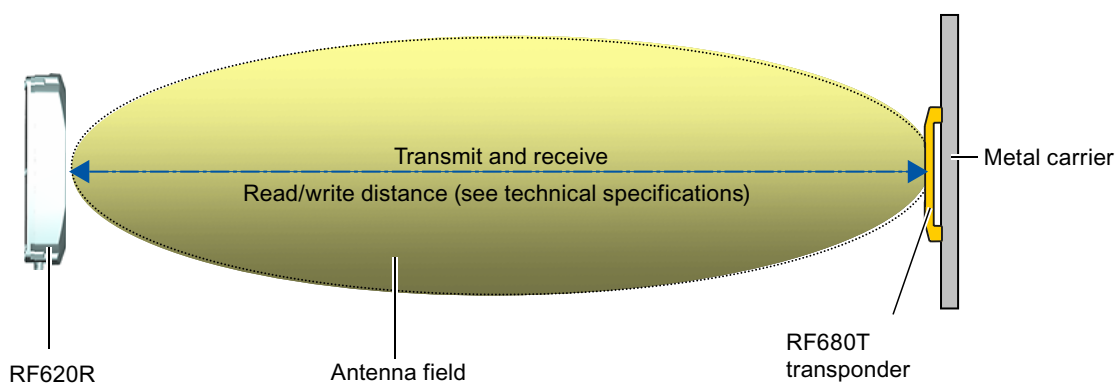


Figure 7-50 Example of optimum antenna/transponder positioning

7.9.3.4 Reading range when mounted on plane metallic carrier plates

The transponder generally has linear polarization. The polarization axis runs as shown in the diagram below. If the transponder is centrally mounted on a plane metal plate, which may either be almost square or circular, it can be aligned in any direction if the transmitting and receiving antennas operate with circular polarization (such as RF660A and RF620R).

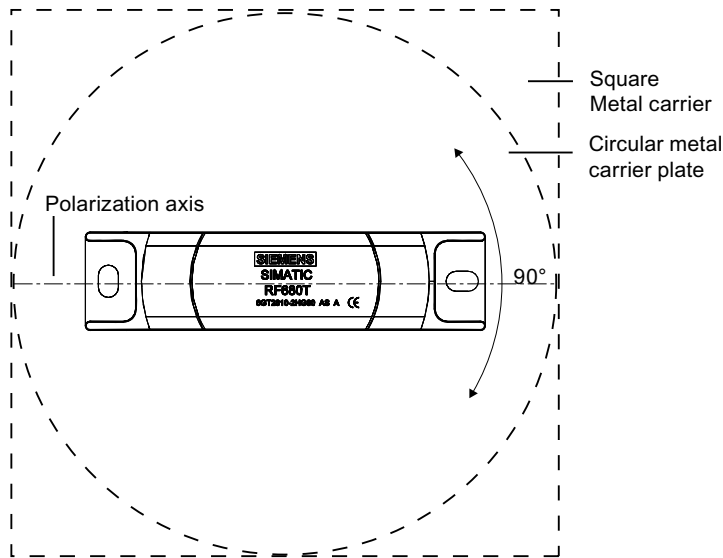


Figure 7-51 Optimum positioning of the transponder on a (square or circular) metallic carrier plate

Table 7- 28 Reading range with metallic, plane carriers with spacer

Carrier plate material	Reading range Europe	Reading range USA
Metal plate 150 x 150 mm	Typ. 4 m	Typ. 4 m

On rectangular carrier plates, the reading distance depends on the mounting orientation of the transponder. A 90° rotation of the transponder about the axis of symmetry may result in greater reading distances.

7.9.3.5 Influence of conducting walls on the reading range

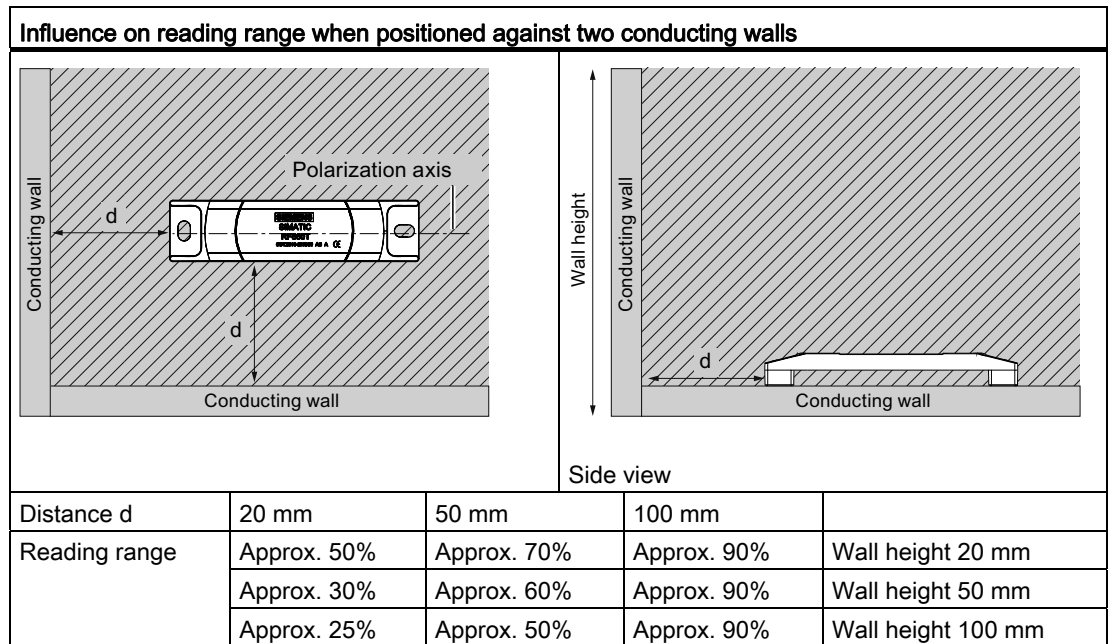
If there are conducting walls or restrictions in the vicinity that shade the radio field, a distance of approx. 10 cm is recommended between the transponder and the wall. In principle, walls have least influence if the polarization axis is orthogonal to the conducting wall.

Reading range: One conducting wall

Influence on reading range when positioned orthogonally to the conducting wall				
Top view				
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 100%	Approx. 100%	Approx. 100%	Wall height 20 mm
	Approx. 100%	Approx. 100%	Approx. 100%	Wall height 50 mm
	Approx. 80%	Approx. 100%	Approx. 100%	Wall height 100 mm

Influence on reading range when positioned parallel to the conducting wall				
Top view				
Distance d	20 mm	50 mm	100 mm	
Reading range	Approx. 50%	Approx. 70%	Approx. 90%	Wall height 20 mm
	Approx. 40%	Approx. 70%	Approx. 90%	Wall height 50 mm
	Approx. 30%	Approx. 50%	Approx. 90%	Wall height 100 mm

Reading range: Two conducting walls



The values specified in the tables above are reference values.

7.9.3.6 Directional radiation pattern of the transponder on metallic surfaces

It is recommendable to align the transponder parallel to the transmitting antenna. If, however, the transponder including the metallic carrier plate is tilted, the reading range will be reduced.

Rotation about the polarization axis or orthogonal to the polarization axis

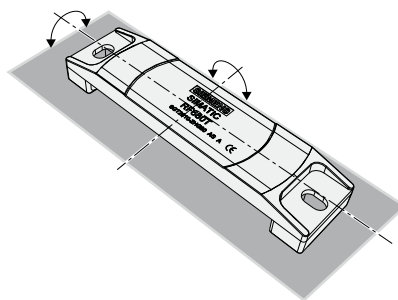
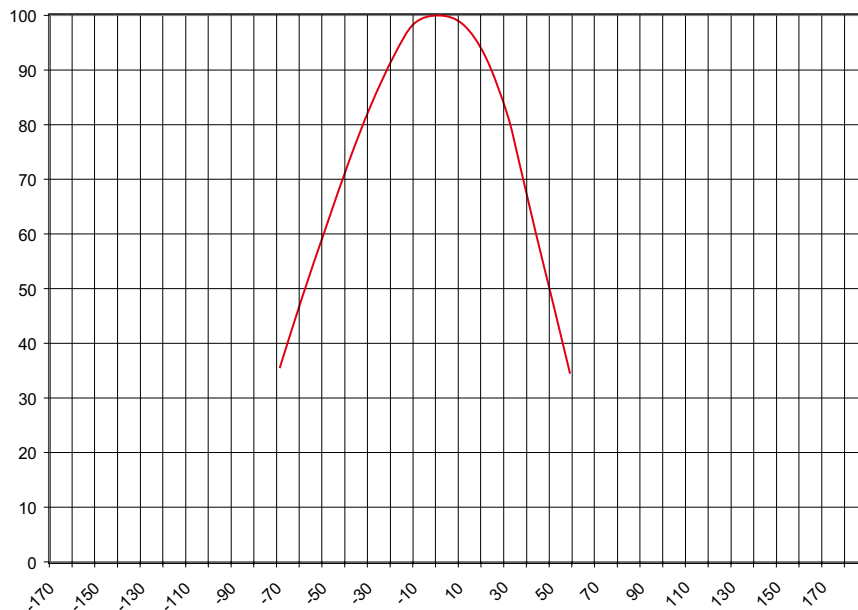


Figure 7-52 Characteristic of the transponder when rotated about the polarization axis or orthogonally to the polarization axis

Note

Please note that the directional effect is dependent on the size of the metal surface. The larger the metal surface, the larger the directional effect.

7.9.4 Mounting instructions

Mount the SIMATIC RF680T transponder on the base using two M6 screws.



Figure 7-53 Mounting SIMATIC RF680T

Properties	Description
Type of mounting	M6 screw mounting
Tightening torque (at room temperature)	≤ 1 Nm (Note the expansion coefficients of the materials used at high temperatures!)

NOTICE
Reduction of the read/write distance When mounting on metal or conductive material, ensure that the space below the transponder remains empty.

7.9.5 Memory configuration of the transponder

The memory configuration of the transponder is described in the section SIMATIC memory configuration of the RF600 transponders and labels (Page 270).

7.9.6 Technical specifications

7.9.6.1 Mechanical data

Property	Description
Dimensions (L x W x H)	130 x 32 x 15 mm
Design	Plastic housing (PPS)
Housing color	Black
Weight	Approx. 50 g
Mounting on metal	Yes

7.9.6.2 Electrical data

Property	Description	
	Europe	USA / Canada
Air interface	According to ISO 18 000-6 C	
Frequency range	865 ... 868 MHz	915 ... 928 MHz
Necessary ²⁾ transmit power	2 W (ERP)	4 W (EIRP)
Read distance <ul style="list-style-type: none"> • on non-metallic carriers • On metal¹⁾ 	<ul style="list-style-type: none"> • Typ. 4 m • Typ. 4 m 	
Write distance <ul style="list-style-type: none"> • on non-metallic carriers • On metal¹⁾ 	<ul style="list-style-type: none"> • Typ. 3 m • Typ. 3 m 	
Polarization type	Linear	
Minimum distance to transmitting antenna	Approx. 0.2 m	
Energy source	Magnetic energy via antenna, without battery	
Multi-tag capability	Yes, minimum distance between transponders \geq 50 mm ³⁾	

- 1) Plane metal surface 15 x 15 cm, reduction of range to about 70% at the band limit 928 MHz on metal surfaces; detection is guaranteed at 915 MHz due to frequency hopping procedure.
- 2) For maximum read/write distances at room temperature
- 3) When the minimum distances are not reached, there is a reduction in the maximum read and write distances of the transponders.

7.9.6.3 Memory specifications

Property	Description
Type	EPC Class 1 Gen2
Memory organization	96 bits/240 bits EPC code
User memory	64 bytes
Protocol	ISO 18000-6C
Data retention time	10 years
Read cycles	Unlimited
Write cycles	Typ. 1 000 000 (at +40 °C)

7.9.6.4 Environmental conditions

Property	Description		
Ambient temperature	• Operation	-25 °C ... +100 °C	Permanent
		from 100 °C ... +140 °C	20% reduction in the limit distance
		+200 °C ²⁾	Tested up to 5000 hours or 3000 cycles
	• Transport and storage	+220 °C	Tested up to 2000 hours or 1500 cycles
Shock Vibration compliant with EN 60721-3-7 Class 7 M3		50 g, ¹⁾ 20 g ¹⁾	
Torsion and bending load		Not permissible	
Degree of protection		<ul style="list-style-type: none"> • IP68 according to EN 60529: (60 minutes. Immersion in cleaning fluids, fluid depth 5 m top edge of housing) • Dipping lacquer • IPx9K (steam jet: 150 mm; 10 to 15 l/min; 100 bar; 75 °C) 	
Silicone-free		Yes	
MTBF		1,6 · 10 ⁷ h	

¹⁾ The values for shock and vibration are maximum values and must not be applied continuously.

²⁾ Note that no processing is possible at temperatures of +140 °C or higher.

7.9.6.5 Chemical resistance of the RF680T transponder

The following table provides an overview of the chemical resistance of the data memory made of polypropylene sulfide.

	20 °C	65 °C
Ammonia, w. conc.	○	-
Butane gas	+	+
Butyl acetate (acetic acid butyl ester)	+	+
Calcium chloride	+	+
Chlorine	-	-
Chrome baths, tech.	-	-
Acetic acid, w. 10%	+	+
Ethyl alcohol, w., undenaturated	+	+
Formaldehyde	+	+
Isopropanol	+	+
Methyl alcohol	+	+
Lactic acid, w.	+	+
Sodium carbonate, w. (soda)	+	+
Sodium chloride, w.	+	+
Sodium hydroxide 10%	+	+
Nitrobenzol	○	-
Phosphoric acid	-	-
Propane	+	+
Nitric acid 10%	-	-
Hydrochloric acid 10%	-	-
Sulfur dioxide, minimal	+	+
Sulfuric acid 25%	-	-
Hydrogen sulfide, dry	+	+
Carbon tetrachloride	○	-

Abbreviations	
+	Resistant
○	Limited resistance
-	Not resistant

7.9.7 Certificates and approvals

Table 7- 29 6GT2810-2HG80 - RF680T Gen 2 UHF- Europe



Certificate	Description
	Conformity with R&TTE directive

Table 7- 30 6GT2810-2HG80- RF680T Gen 2 UHF- USA / Canada

Standard	
FCC Federal Communications Commission	Passive labels or transponders comply with the valid regulations; certification is not required.
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): <ul style="list-style-type: none"> • UL508 - Industrial Control Equipment • CSA C22.2 No. 142 - Process Control Equipment • UL Report E 120869

7.9.8 Dimension drawing

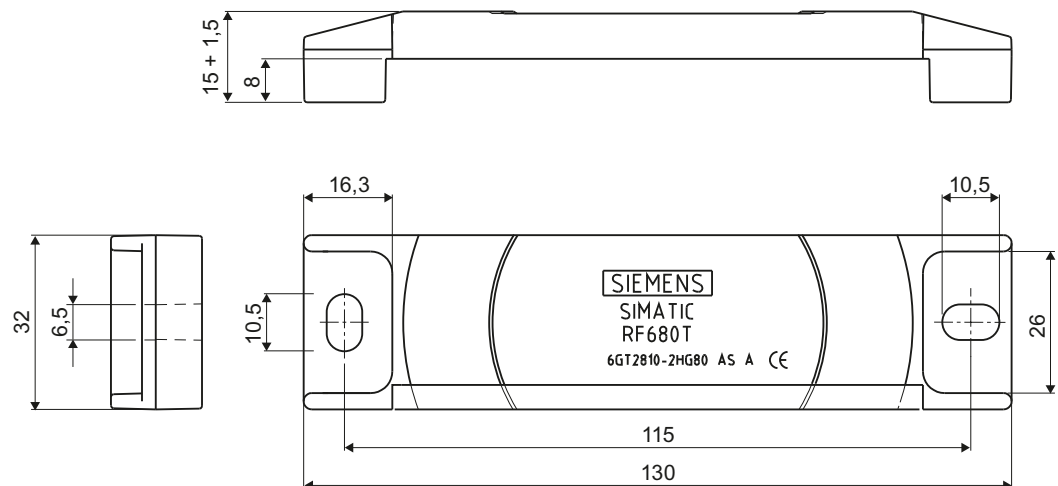


Figure 7-54 Dimension drawing of SIMATIC RF680T

Units of measurement: All dimensions in mm

Tolerances, unless indicated otherwise, are ± 0.5 mm.

Integration into networks

8.1 Overview of parameterization of RF600 reader

The parameterization possibilities that are available to you for each reader of the RF600 family are outlined below. You will find detailed information on parameterization in the specified chapters of the documentation:

Readers	SIMATIC command messages	RF-MANAGER Basic V2	XML commands	RFID reader interface
RF670R		Online help > chapter "Working with RFID objects"	SIMATIC RF Function Manual, Chapter "Standard Configuration Messages"	
RF630R	"Configuration Manual RF620R/RF630R", chapter "Overview of commands"			
RF620R	"Configuration Manual RF620R/RF630R", chapter "Overview of commands"			
RF680M				Function Manual Mobile Reader, section "RFID Reader Interface Reference"

8.2 Integration in IT networks via the user application

Connecting the readers RF640R/RF670R using XML

If you want to create your own applications for the RF640R/RF670R reader, you can do this using the XML-based interface of the reader. For detailed information on configuring the reader using RF-MANAGER Basic V2, refer to the online help. For information about XML commands, refer to the "SIMATIC RF Function Manual" .

8.3 Integration in SIMATIC networks

Connecting the readers RF620R/RF630R

RF620R and RF630R readers are connected to the controller via the following adapter/communication modules:

- SIMATIC RF170C
- SIMATIC RF180C
- ASM 456

The RF182C communication module is connected with the PC directly over Ethernet.

Function blocks, interface modules/communication modules and readers

Table 8- 1 Table of reader/interface modules

Function blocks	Interface modules/communication modules						
	ASM 456	RF170C ¹⁾	RF180C	ASM 475	RF182C	RF160C	RFID 181EIP
FB 45	1 - 2 readers	1 - 2 readers	1 - 2 readers	1 - 2 readers	N/A	N/A	N/A
FB 55	1 - 2 readers	1 - 2 readers	1 - 2 readers	1 - 2 readers	N/A	N/A	N/A
XML	N/A	N/A	N/A	N/A	1 - 2 readers	N/A	N/A
FC 44	N/A	N/A	N/A	N/A	N/A	1 - 2 readers	N/A
Ethernet/IP	N/A	N/A	N/A	N/A	N/A	N/A	1 - 2 readers

With all possible combinations, the input voltage at the communications module must not be below 21.6 V.
¹⁾ If 2 readers are used with an RF170C, the CM/ASM can only be operated with a ambient temperature of max. 55 °C.

Interface modules/communication modules and function blocks

Table 8- 2 Overview of interface modules/communication modules

ASM/CM	Interfaces to the application (PLC)	Interfaces to the reader	Function blocks	Reader connections	Dimensions (W x H x D) in mm	Temperature range	Degree of protection
ASM 456	PROFIBUS DP-V1	2 x 8-pin connection socket, M12	FB 45 FC 55	2 (parallel)	60 x 210 x 54 or 79	0 ... +55 °C	IP67
SIMATIC RF170C	PROFIBUS DP-V1 PROFINET IO	2 x 8-pin connection socket, M12	FB 45 FC 55	2 (parallel)	90 x 130 x 60	-25 ... 55° C	IP67
SIMATIC RF180C	PROFINET IO	2 x 8-pin connection socket, M12	FB 45	2 (parallel)	60 x 210 54	0 ... +60° C	IP67
SIMATIC RF182C	TCP/IP	2 x 8-pin connection socket, M12	-	2 (parallel)	60 x 210 x 54	0 ... +60° C	IP67

The following table shows which readers can be connected to which interface modules/communication modules.

Configuration with SIMATIC RF170C

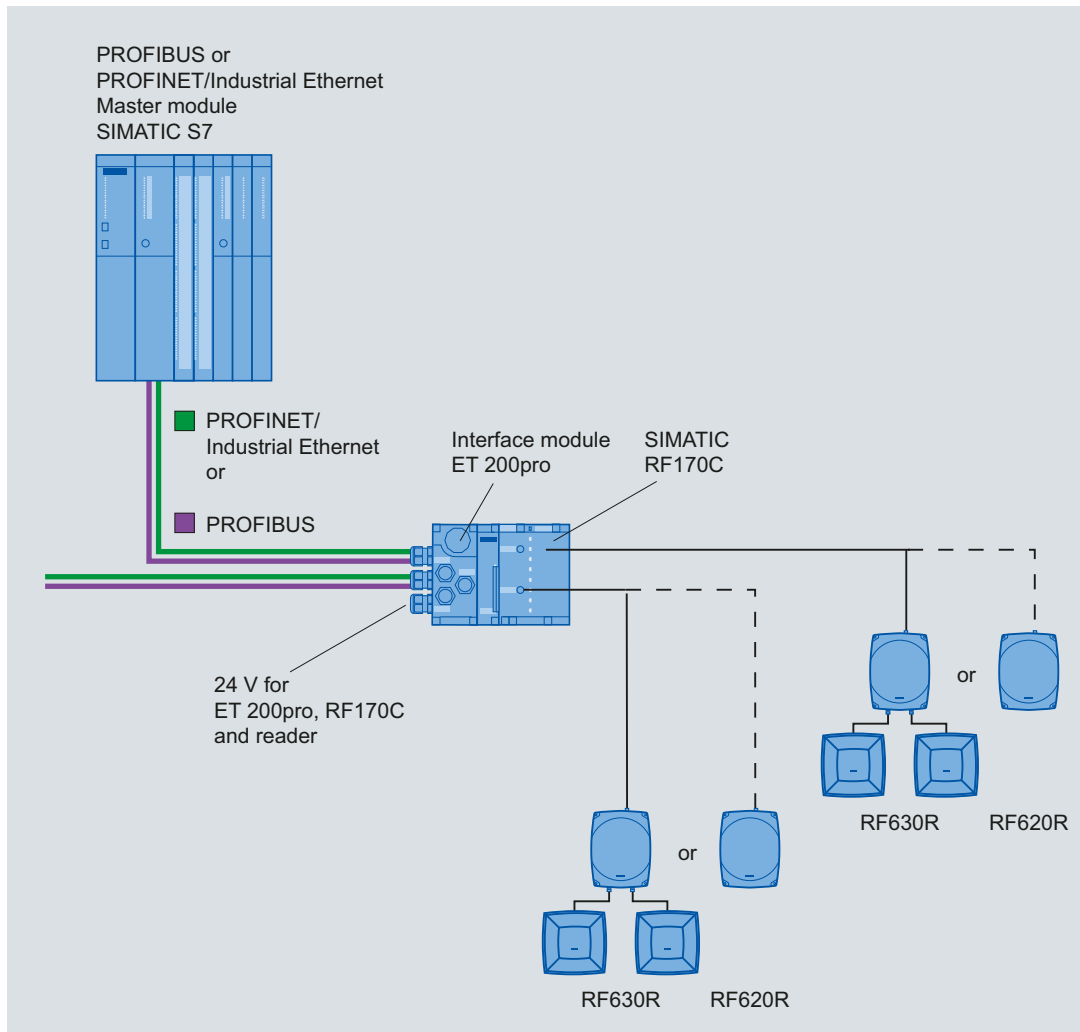


Figure 8-1 Configuration with SIMATIC RF170C

For more detailed information, please refer to SIMATIC RF170C Operating Instructions (<http://support.automation.siemens.com/WW/view/en/32622825>).

Configuration with SIMATIC RF180C

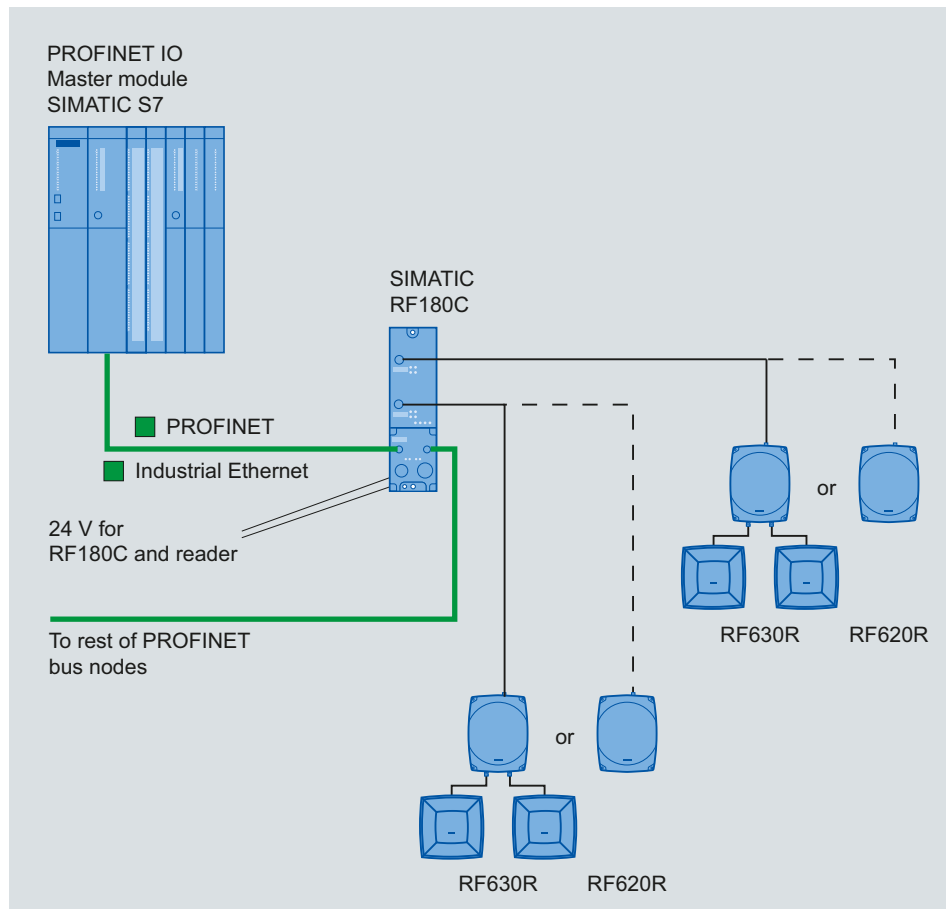


Figure 8-2 Configuration with SIMATIC RF180C

For more detailed information, please refer to SIMATIC RF180C Operating Instructions (<http://support.automation.siemens.com/WW/view/en/30012157>).

Configured with ASM 456

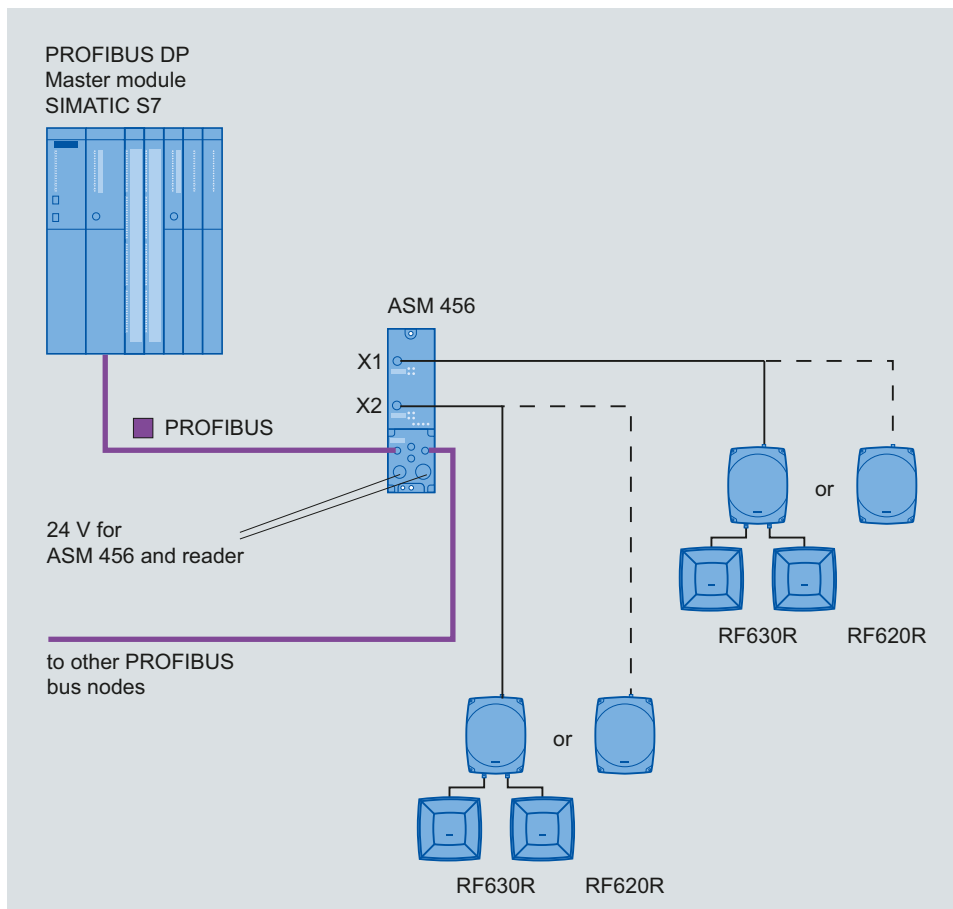


Figure 8-3 Configured with ASM 456

For more detailed information, please refer to ASM 456 Operating Instructions (<http://support.automation.siemens.com/WW/view/en/32629442>).

Configuration with RF182C

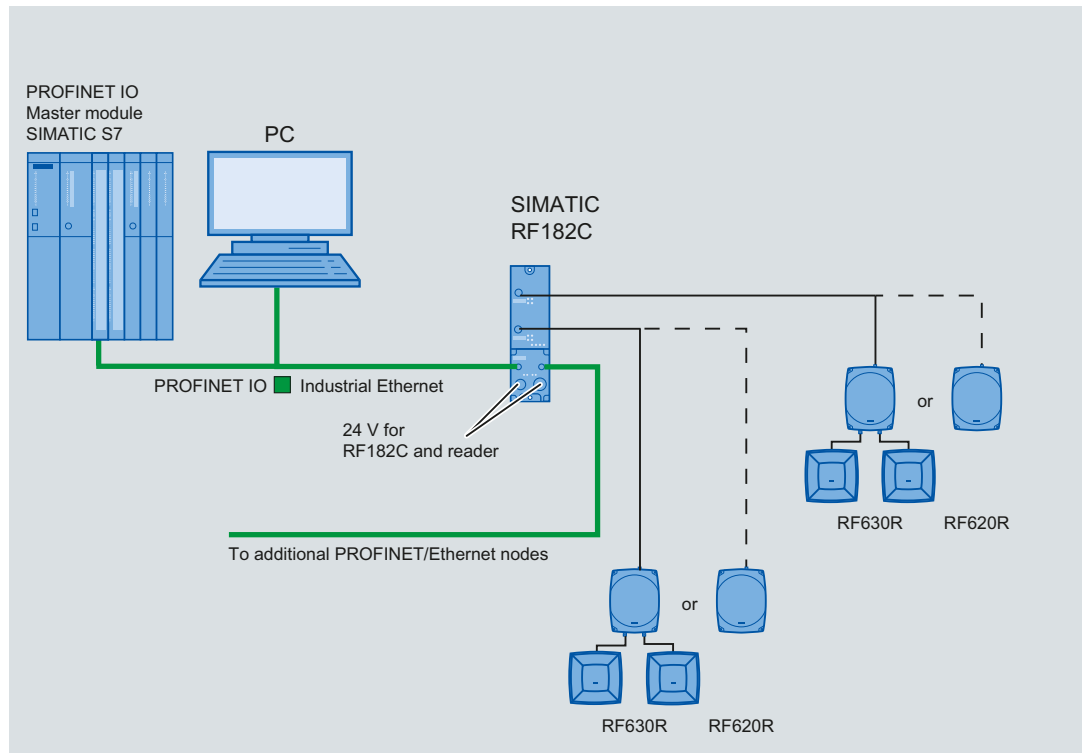


Figure 8-4 Configuration with SIMATIC RF182C

For more information, see SIMATIC RF182C Operating Instructions (<http://support.automation.siemens.com/WW/view/en/38507897>)

System diagnostics

9.1 Flashing codes of the RF600 readers with Ethernet interface

Error description	Flashing of ERR LED	
	Number	Repetitions
Reader inactive, no configuration data	Lit constantly	Permanent
Antenna 1 not connected or defective	3	Permanent
Antenna 2 not connected or defective	4	Permanent
Antenna 3 not connected or defective	5	Permanent
Antenna 4 not connected or defective	6	Permanent
Reading of user-defined memory has failed	11	3 times
Writing of user-defined memory has failed	12	3 times
The "SendCommand" function has failed	13	3 times
Wrong or missing password	14	3 times
Writing of the tag ID has failed	15	3 times
LOCK has failed	16	3 times
KILL has failed	17	3 times
Access to impermissible memory areas	18	3 times
Too many tags in the field	19	3 times
General software errors	20	Permanent
Impermissible message frame; Impermissible message frame parameter	29	3 times
Incorrect message frame format	30	3 times
The "SetReadProtect" NXP function has failed	31	3 times
The "ResetReadProtect" NXP function has failed	32	3 times
General error during detection of tags (inventory)	33	3 times

The LED states are described in chapter Status display (Page 165).

9.2 Error messages RF600 reader

A description of the RF640R/RF670R error codes can be found in the "SIMATIC RF Function Manual".

9.3 Error messages and flash codes for RF620R/RF630R

error_MOBY

The ERR LED of the reader flashes when the ASM reports error messages.

Table 9- 1 Error messages of the MOBY-ASM via the "error_MOBY" variable

Error code (B#16#..)	Flashing of ERR LED	Description
00	–	No error Default value if everything is ok.
	1x	Boot message
01	2x	Presence error, possible causes: <ul style="list-style-type: none"> • The active command was not carried out completely • The tag has left the field while the command is being processed • Communication fault between reader and tag The next command is automatically executed on the next tag. A read or write command is possible.
02	2x	Presence error: A tag has passed by a reader without being processed by a MOBY command. <ul style="list-style-type: none"> • This error message is not reported immediately. Instead, the ASM waits for the next command (read, write). This command is immediately replied to with this error. This means that a read or write command is not processed. The next command is executed normally by the ASM again. An init_run from FB 45 also resets this error state. • Bit 2 is set in parameter "option_1" and no tag is in the transmission window.
03	3x	Error in the connection to the reader. The reader does not answer. <ul style="list-style-type: none"> • Cable between MOBY ASM and reader is wired incorrectly or cable break. • Antenna error: (Cable is defective), cable is no longer connected • The 24 V supply voltage is not connected or is not on or has failed briefly. • Automatic fuse on the ASM has blown. • Hardware defect • Another reader is in the vicinity and is active. • Interference on reader - or PROFIBUS line • Execute init_run after error correction

Error code (B#16#..)	Flashing of ERR LED	Description
04	4x	<p>Error in tag memory</p> <p>The tag has never been write-accessed or has lost the contents of its memory due to battery failure.</p> <ul style="list-style-type: none"> • Replace tag (if battery bit is set). • Initialize tag with the STG • Re-initialize tag
05	5x	<ul style="list-style-type: none"> • Unknown command • Incorrect parameter • Function not allowed • Mode in SET-ANT command unknown <p>FB 45/FC 55 is sending an uninterpretable command to the MOBY-ASM.</p> <ul style="list-style-type: none"> • Command_DB contains invalid command parameters. • The command_DB was overwritten by the user • The MDS reported an address error.
06	6x	<p>Field disturbance on reader</p> <p>The reader is receiving interference pulses from the environment.</p> <ul style="list-style-type: none"> • The distance between two readers is too small and does not correspond to the configuration guidelines • The connecting cable to the reader is defective or too long or does not comply with the specification
07	7x	No free ETSI transmit channel
09		Wrong communications standard selected in the init_run command (e.g. FCC in ETSI reader)
0B	11x	<p>Tag memory cannot be read correctly or cannot be written.</p> <p>Tag reports an error:</p> <ul style="list-style-type: none"> • Other error (0000000B) * • Insufficient power (00001011B): Tag is in the limit range * • Non-specific error (00001111B) *
0C	12x	<p>The tag memory cannot be write-accessed.</p> <ul style="list-style-type: none"> • Tag memory is defective • Memory is write-protected (Memory Locked: 000000100B) (The tag memory is PERMA-locked and cannot be overwritten or the reader password has to be reset)
0D	13x	<p>Error in specified address (address error)</p> <ul style="list-style-type: none"> • The specified address does not exist on the tag • The command must be checked and corrected. • This is not the correct tag type. • Access attempted to non-existent or non-accessible memory areas (Memoryoverrun: 00000011B)

Error code (B#16#..)	Flashing of ERR LED	Description
0E	14x	<p>Password error</p> <ul style="list-style-type: none"> Incorrect tag password (the reader password must be set again so that it agrees with the password).
0F	1x	<p>Start-up message from ASM. The ASM was off and has not yet received an init_run command</p> <ul style="list-style-type: none"> Execute an init_run The same physical ASM channel is used in two (or more) UDT 10 structures. Check the ASM_address and ASM_channel in <i>a//UDT 10</i> structures.
10	16x	<p>NEXT command not possible or not permitted</p> <ul style="list-style-type: none"> ASM is operating without MDS control (MDS_control = 0.1) ASM has already received a Next command. ASM / write/read device doesn't recognize NEXT command. <p>REPEAT after forbidden commands:</p> <ul style="list-style-type: none"> REPEAT for SET-ANT REPEAT for SLG status
11	–	<p>Short circuit or overload of the 24 V outputs (DQ, error code, presence)</p> <ul style="list-style-type: none"> The affected output is turned off. All outputs are turned off when total overload occurs. A reset can only be performed by turning the 24 V voltage off and on again. Then start init_run.
12	18x	<p>Internal ASM communication error</p> <ul style="list-style-type: none"> Connector contact problem on the ASM Defective ASM hardware <ul style="list-style-type: none"> Return ASM for repair Start init_run command after error correction.
13	19x	<ul style="list-style-type: none"> ASM/reader does not have enough buffer to store the command intermediately. Maximum allowable number of 150 commands in a command chain was ignored. If REPEAT is used in connection with a command chain, the maximum number of commands is also 150 (including the REPEAT command). If a command chain contains more than 150 commands, after the 150th command is called, it will be canceled and the above error message will be sent without processing the complete chain. Commands in the command chain that have already been executed can still be sent later after the error message "0x13" is sent.

Error code (B#16#..)	Flashing of ERR LED	Description
14	20x	Internal ASM / write/read device error <ul style="list-style-type: none"> • Program sequence error on the ASM • Turn power of ASM off and on again. • Start init_run command after error correction. • Watchdog error on reader
15	21x	Wrong parameterization of the ASM/reader <ul style="list-style-type: none"> • Check INPUT parameters in UDT 10 • Check parameters in HW Config • Transmit power set too high • Unused parameter bits are not 0. • init_run command is parameterized incorrectly • After a start-up, the ASM has still not received an init_run. • Parameter scanning_time = 0x00 was set (no standard selected).
16	22x	The FB command cannot be executed with the ASM parameters on PROFIBUS. <ul style="list-style-type: none"> • Length of the input/output areas too small for the cyclic I/O word. Did you use the right GSD file? • FB command (e.g. read) has too much user data (data length > 233 bytes)
17	23x	Communication error between FB 45/FC 55 and MOBY-ASM. Handshake error <ul style="list-style-type: none"> • Params_DB (UDT 10) of this ASM station is being overwritten by other parts of the program • Check parameters of MOBY-ASM in UDT 10 • Check FB 45/FC 55 command which caused this error. • Start init_run command after error correction.
18	–	An error has occurred which must be acknowledged with an init_run. <ul style="list-style-type: none"> • A temporary short circuit has occurred on PROFIBUS. • The init_run command is faulty • Start init_run command after error correction. • Check parameters ASM_address, ASM_channel, and MOBY_mode.

Error code (B#16#..)	Flashing of ERR LED	Description
19	25x	<p>Previous command is active or buffer overflow. The user sent a new command to the ASM although the last command was still active.</p> <ul style="list-style-type: none"> • Active command can only be terminated with an init_run. • Before a new command can be started the READY bit must be 1 (exception: init_run). • Two FB 45/FC 55 calls were parameterized with the same parameters "ASM_address" and "ASM_channel" • Two FB 45/FC 55 calls are using the same Params_DB pointer • Start init_run command after error correction. • When command repetition (e.g. read-only MDS) is used, no data are fetched from the tag. The data buffer on the ASM has overflowed. Tag data have been lost.
1A	–	<p>PROFIBUS DP error occurred.</p> <ul style="list-style-type: none"> • The PROFIBUS DP bus connection was interrupted <ul style="list-style-type: none"> – Wire break on the bus – Bus connector on ASM was removed briefly • PROFIBUS DP master no longer addresses the ASM • Execute an init_run • The ASM has detected a message frame interruption on the bus. The PROFIBUS may have been reconfigured (e.g. with HW Config). <p>This error is only indicated when access monitoring has been enabled in the PROFIBUS configuration.</p>
1B	27x	<p>There is an inconsistency in the parameterization of the reader. In expert mode, parameters were probably set which the reader cannot use.</p> <ul style="list-style-type: none"> • ETSI performance testing faulty
1C	28x	<ul style="list-style-type: none"> • Antenna is already switched off • Antenna is already switched on • Mode in SET-ANT command not recognized.


Error code (B#16#..)	Flashing of ERR LED	Description
1D	–	<p>More MDSes are in the transmission window than the SLG is capable of processing simultaneously.</p> <ul style="list-style-type: none"> • Only 1 MDS can be processed at a time with FB 45. • With FB 45 and FC 55: there is more than one tag with the same EPC ID in the antenna field of the reader. • With FC 55: Increase the value in multitag or decrease the number of MDSes in the field. • With FC 55: A read or write command has been sent on a transponder (UID) and there are one or more transponders in the antenna field, for which the contents of the addresses FF00 – FF03 of the EPC ID do not agree (unambiguity when transponder is accessed via 8-byte long UID). • Power supply of the MDS in the limit range: Due to short-term power shortage, an MDS loses its communications status (session), upon which the identical EPC-ID is sent a second time as soon as the power threshold is exceeded again. Increase the reader's radiated power and/or reduce the distance between antenna and MDS until this effect no longer occurs.
1E	30x	Wrong number of characters in the command message frame.
1F	31	<p>Running command canceled by RESET (init_run or cancel) or bus connector removed</p> <ul style="list-style-type: none"> • Communication with the tag was terminated by init_run. • This error can only be reported on init_run or cancel

*) You will find the meaning of the error numbers in the EPC Global Class 1 Gen 2 document, Annex I.

Accessories

10.1 Wide-range power supply unit for SIMATIC RF systems

10.1.1 Features

Wide-range power supply unit for SIMATIC RF systems	
	<p>(1) DC output 1 (2) DC output 2 (3) Mains connection</p>
Features	
<ul style="list-style-type: none"> • Wide-range input (3) for use worldwide • Dimensions without mains cable: 175 x 85 x 35 mm • Dimensions including mains cable: 250 x 85 x 35 mm • CE-compliant (EU and UK versions) • UL-certified for US and Canada (US version) • Mechanically and electrically rugged design • Secondary side (1), (2): 24 V DC / 3 A • Short-circuit and no-load stability • Suitable for frame mounting • 3 versions for use in the EU, UK, US 	

10.1 Wide-range power supply unit for SIMATIC RF systems

Description

The wide-range power supply unit for SIMATIC RF systems is a universal compact power supply and provides the user with an efficient, cost-saving solution for many different mid-range power supply tasks.

The primary switched power supply is designed for use on single-phase AC systems. The two DC outputs (sockets) are connected in parallel and protected by a built-in current limiting circuit against overload and short-circuits.

The device is vacuum-cast and prepared for Safety Class 2 applications. The EU and UK versions satisfy the low-voltage guideline as well as the current EU standards for CE conformity. Furthermore, the US version has been UL-certified for the US and Canada.

10.1.2 Scope of supply

- Wide-range power supply unit for SIMATIC RF systems
- 2 m mains cable (country-specific)
- Protective cover for flange outlet
- Operating Instructions

10.1.3 Ordering data


Wide-range power supply unit for SIMATIC RF-systems (100 - 240 VAC / 24 VDC / 3 A) with 2 m connecting cable with country-specific plug	EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20
24 V connecting cable for SIMATIC RF640R/RF670R, length 5 m	6GT2891-0NH50

Note

Risk of confusion

Note that you cannot use the 24 V connecting cables of the discontinued RF660R reader for the RF640R and RF670R readers.

10.1.4 Safety Information


 WARNING
Danger to life
It is not permitted to open the device or to modify the device.
The following must also be taken into account:
<ul style="list-style-type: none">• Failure to observe this requirement shall constitute a revocation of the CE approval, UL certification for the US and Canada as well as the manufacturer's warranty.• For installation of the power supply, compliance with the DIN/VDE requirements or the country-specific regulations is essential.• The field of application of the power supply is limited to "Information technology in electrical office equipment" within the scope of validity of the EN 60950/VDE 0805 standard.• When the equipment is installed, it must be ensured that the mains socket outlet is freely accessible.• The housing can reach a temperature of +25 °C during operation without any adverse consequences. It must, however, be ensured that the power supply is covered in the case of a housing temperature of more than +25°C to protect persons from contact with the hot housing. Adequate ventilation of the power supply must be maintained under these conditions.


NOTICE
The wide-range power supply unit must only be used for SIMATIC products in the specifically described operating range and for the documented intended use.

If the wide input range power supply for SIMATIC RF systems is used for an end product other than the SIMATIC RF600 system, the following must be taken into account:

- The electric strength test of the end product is to be based upon a maximum working voltage of: Transition from primary to SELV: 353 VDC, 620 Vpk
- The following secondary output circuits are SELV (low voltage; SELV = Safety Extra Low Voltage): all
- The following secondary output circuits are at non-hazardous energy levels: all
- The power supply terminals and/or connectors are suitable for field wiring if terminals are provided.
- The maximum investigated branch circuit rating is: 20 A
- The investigated pollution degree is: 2

10.1 Wide-range power supply unit for SIMATIC RF systems


 WARNING
If the wide input range power supply for SIMATIC RF systems is connected to an end product other than end products of the RF600 family, the end user is responsible and liable for operation of the system or end product that includes the wide input range power supply for SIMATIC RF systems.

 WARNING
Alterations to the SIMATIC RF600 components and devices as well as the use of SIMATIC RF600 components with third-party RFID devices are not permitted. Failure to observe this requirement shall constitute a revocation of the radio equipment approvals, CE approval and manufacturer's warranty. Furthermore, the compliance to any salient safety specifications of VDE/DIN, IEC, EN, UL and CSA will not be guaranteed.

Safety notes for the US and Canada

The SIMATIC RF640R/RF670R reader may only be operated with the wide range power supply unit for SIMATIC RF systems - as an optional component – or with power supply units that are UL-listed according to the safety standards specified below:

- UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements
- CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment.

 WARNING
The compliance of the SIMATIC RF600 system to the safety standards mentioned above will not be guaranteed if neither the wide-range power supply unit for SIMATIC RF systems nor power supplies listed according to the safety standards above are used.

10.1.5 Connecting

- There are three different (country-specific) mains cables for the EU, UK and US. The appropriate mains cable must be connected to the primary input of the power supply.

NOTICE
It is only permissible to insert or remove the mains cable when the power supply is de-energized.

- The wide-range power supply unit has total insulation (Safety Class 2), IP65
- It can be mounted using four fixing holes.

10.1.6 Technical specifications

Table 10- 1 General technical specifications

Insulation stability (prim./sec.) $U_{ins\ p/s}$		3.3 kV _{AC}
Insulation resistance R_{ins}		>1 G Ω
Leakage current I_{leak}	$U_{in} = 230\ V_{AC}, f = 50\ Hz$	< 200 μA
Safety class (SELV)	Designed for installation in devices of Safety Class 2	
Mains buffering t_h	$U_{in} = 230\ V_{AC}$	$\geq 50\ ms$
Ambient temperature		-25 °C to +55 °C
Surface temperature	Module top, center	Max. 96 °C
Storage temperature		-40 °C to +85 °C
Self-heating on full-load		max. 45 K
Interference immunity ESD HF fields Burst Surge HF injection Mains quality test	EN 61000-4-2, 4-3 up to 4-6, 4-11	Air discharge: 15 kV 10 V/m symmetrical: 2 Symmetrical: 1 10 V _{rms}
Cooler		Free convection
Dimensions L x W x H		175 mm x 85 mm x 35 mm
Weight		720 g
Housing / casting		UL 94-V0
Power supply class	according to CSA	Level 3
Degree of protection	IP65	
MTBF in years		255

Table 10- 2 Technical specifications for the input

Rated input voltage U_{in}	EN 60950 / UL 60950	100 to 240 V _{AC} 120 to 353 V _{DC}
Input voltage range U_{in}		94 to 264 V _{AC} 120 to 375 V _{DC} (UL: 353 V _{DC})
Input frequency f_{in}		50/60 Hz
Radio interference level		EN 55011/B
Switching frequency f_{sw}		approx. 70 kHz typ.
Length of cable		2 m

10.1 Wide-range power supply unit for SIMATIC RF systems

Table 10-3 Technical specifications of the output

Output voltage tolerance ΔU_{out}	$U_{in} = 230 V_{AC}$	$U_{out nom} \leq +2 \% / -1 \%$
Overvoltage protection		$U_{out nom} +20 \% typ.$
Noise ΔU_{LF}	$U_{in} = min., BW: 1 MHz$	$\leq 1 \% U_{out}$
Noise ΔU_{HF}	$U_{in} = min., BW: 20 MHz$	$\leq 2 \% U_{out}$
Line Regulation Load Regulation	$U_{in} = min./max.$ $I_{out} = 10...90...10 \%$	$\leq 1,0 \%$ $\leq 1,0 \%$
Short-circuit current I_{max}	$I_{nom} = 4 A (+50^{\circ}C)$	105 ... 130 % I_{nom}
Settling time t_R load variations	$I_{out} = 10...90...10 \%$	< 5 ms
Temperature coefficient ϵ	$T_A = -25^{\circ}C$ to $+70^{\circ}C$	0.01 %/K
Overload behavior P_{over}		Constant current
Short-circuit protection/ No-load response		Continuous/no-load stability
Derating	$T_A > +50^{\circ}C$ to $+70^{\circ}C$	max. 2 %/K
Connector type	Flanged connector Binder, Order no.: 09-3431-90-04	4 pins

Table 10-4 Output configurations

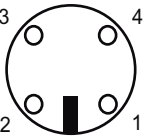
Input	Outputs $U_1 = U_2$	$I_{Load} =$ $I_1 + I_2$	Efficiency (%)	Remarks
110 VAC	24 VDC	0 A		No-load stability
110 VAC	24 VDC	3 A	≥ 88	
220 VAC	24 VDC	0 A		No-load stability
220 VAC	24 VDC	3 A	≥ 90	

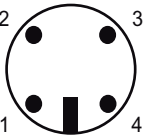
Table 10-5 Compliance with standards

Designation	Standard	Values
Electrical safety	EN 60950 / UL 60950 / CAN/CSA 22.2 950, 3 Edition	
Conducted interference	EN 61000-6-3 EN 55011	Class B
Emission	EN 61000-6-3 EN 55011	Class B

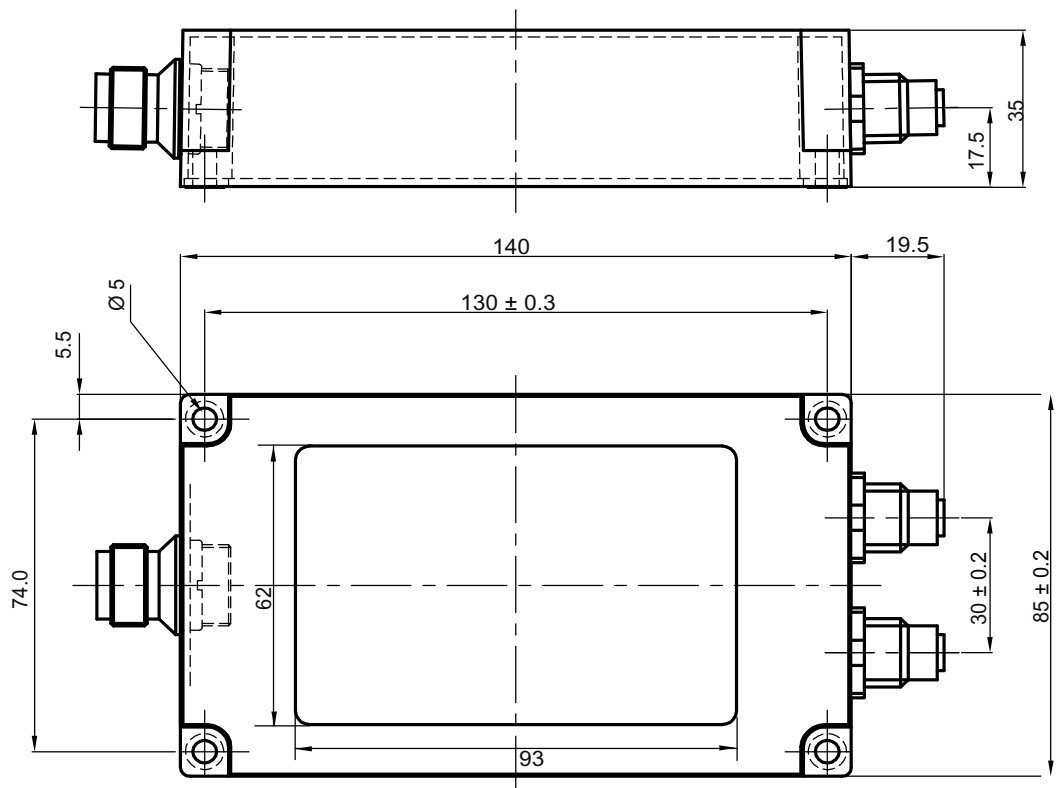
All values are measured at full-load and at an ambient temperature of 25 °C (unless specified otherwise).

10.1.7 Pin assignment of DC outputs and mains connection

DC outputs	Assignment
	(1) Ground (0V)
	(2) +24 V DC
	(3) +24 V DC
	(4) Ground (0V)

Mains connection	Assignment
	(1) 100 to 240 V AC
	(2) n.c.
	(3) 100 to 240 V AC
	(4) n.c.

10.1.8 Dimension drawing



Units of measurement:

All dimensions in mm

10.1.9 Certificates and approvals

Table 10- 6 Wide-range power supply unit for SIMATIC RF systems 6GT2898-0AA00 - Europe, 6GT2898-0AA10 - UK



Certificate	Description
	CE approval to 2004/108/EC EMC 73/23/EEC LVD

Table 10- 7 Wide-range power supply unit for SIMATIC RF systems 6GT2898-0AA20 - USA

Standard	
	This product is UL-certified for the US and Canada. It meets the following safety standards: UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

Appendix

A.1 Certificates and approvals

Notes on CE marking

The following applies to the system described in this documentation:
The CE marking on a device is indicative of the corresponding approval:



DIN ISO 9001 certificate

The quality assurance system for the entire product process (development, production, and marketing) at Siemens fulfills the requirements of ISO 9001 (corresponds to EN29001: 1987).

This has been certified by DQS (the German society for the certification of quality management systems).







EQ-Net certificate no.: 1323-01

Table A- 1 FCC IDs: NXW-RF660, NXW-RF620R, NXW-RF630R, IC: 267X-RF620R, IC: 267X-RF630

Standards	
 Federal Communications Commission	FCC Title 47, Part 15.sections 15.247 Radio Frequency Interference Statement This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.
Industry Canada Radio Standards Specifications	RSS-210 Issue 6, Sections 2.2, A8
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL 60950-1 - Information Technology Equipment Safety - Part 1: General Requirements CSA C22.2 No. 60950 -1 - Safety of Information Technology Equipment UL Report E 205089

Certification for the USA, Canada and Australia


Safety

One of the following markings on a device is indicative of the corresponding approval:	
	Underwriters Laboratories (UL) to UL 60950 Standard (I.T.E), or to UL508 (IND.CONT.EQ)
	Underwriters Laboratories (UL) according to Canadian standard C22.2 No. 60950 (I.T.E) or C22.2 No. 142 (IND.CONT.EQ)
	Underwriters Laboratories (UL) according to standard UL 60950, Report E11 5352 and Canadian standard C22.2 No. 60950 (I.T.E) or UL508 and C22.2 No. 142 (IND.CONT.EQ)
	UL recognition mark
	Canadian Standard Association (CSA) per Standard C22.2. No. 60950 (LR 81690) or per C22.2 No. 142 (LR 63533)
	Canadian Standard Association (CSA) per American Standard UL 60950 (LR 81690) or per UL 508 (LR 63533)

EMC

USA	
Federal Communications Commission Radio Frequency Interference Statement	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Shielded Cables	Shielded cables must be used with this equipment to maintain compliance with FCC regulations.
Modifications	Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.
Conditions of Operations	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA	
Canadian Notice	This Class B digital apparatus complies with Canadian ICES-003.
Avis Canadien	Cet appareil numérique de la classe b est conforme à la norme NMB-003 du Canada.

AUSTRALIA	
	This product meets the requirements of the AS/NZS 3548 Norm.

A.2 Service & support

Technical Support

You can access technical support for all IA/DT projects via the following:

- Phone: + 49 (0) 911 895 7222
- Fax: + 49 (0) 911 895 7223
- E-mail (<mailto:support.automation@siemens.com>)
- Internet: Online support request form: (<http://www.siemens.com/automation/support-request>)

Contact partner

If you have any further questions on the use of our products, please contact one of our representatives at your local Siemens office.

The addresses are found on the following pages:

- In Internet (<http://www.siemens.com/automation/partner>)
- In Catalog CA 01
- In Catalog ID 10 specifically for industrial communication / industrial identification systems

Service & support for industrial automation and drive technologies

You can find various services on the Support homepage (<http://www.siemens.com/automation/service&support>) of IA/DT on the Internet.

There you will find the following information, for example:

- Our newsletter containing up-to-date information on your products.
- Relevant documentation for your application, which you can access via the search function in "Product Support".
- A forum for global information exchange by users and specialists.
- Your local contact for IA/DT on site.
- Information about on-site service, repairs, and spare parts. Much more can be found under "Our service offer".

RFID homepage

For general information about our identification systems, visit RFID homepage (<http://www.siemens.com/ident>).

Technical documentation on the Internet

A guide to the technical documentation for the various products and systems is available on the Internet:

SIMATIC Guide manuals (<http://www.siemens.com/simatic-tech-doku-portal>)

Online catalog and ordering system

The online catalog and the online ordering system can also be found on the Industry Mall Homepage (<http://www.siemens.com/industrymall>).

Training center

We offer appropriate courses to get you started. Please contact your local training center or the central training center in

D-90327 Nuremberg.

Phone: +49 (0) 180 523 56 11

(€ 0.14 /min. from the German landline network, deviating mobile communications prices are possible)

For information about courses, see the SITRAIN homepage (<http://www.sitrain.com>).

Glossary

Active field

Area with minimum field strength containing the sensing range. Within this sensing range, data can be read from the tag or written to the tag.

Active surface

See active field

See active field

Active surface

See active field

See active field

Active tag/transponder

Active transponders are battery-operated, i.e. they obtain the energy required to save data on the microchip from a built-in battery. They are usually in an idle state and do not transmit data in order to increase the energy source's service life. The transmitter is only activated when it receives a special activation signal.

AM

Amplitude modulation; data are present in the changes in carrier frequency amplitude.

Amplitude modulation

See AM

AS

See Automation system

ASM

Interface module, see Communication modules

Automation system (AS)

A programmable logical controller (PLC) of the SIMATIC S7 system, comprising a central controller, a CPU and various I/O modules.

Battery-free data storage unit

Mobile data storage units which operate without batteries. (See transponder). Power is supplied to the data storage unit across an electromagnetic alternating field.

Baud

Unit (digits per second).

Baud rate

The baud rate describes the data transmission's digit rate.

Byte

A group of eight bits

CE guidelines

See CE Label

CE Label

Communauté Européenne (product mark of the European Union)

Communication modules

Communication modules are used to integrate the identification systems in SIMATIC or SINUMERIK systems, or to connect them to PROFIBUS, PROFINET, PC or any other system. Once supplied with the corresponding parameters and data, they handle data communication. They then make the corresponding results and data available. Suitable software blocks (FB/FC for SIMATIC; C libraries for PCs with Windows) ensure easy and fast integration in the application.

Continuous Wave

See CW

CW

Continuous Wave; data are present in the carrier frequency which is switched on and off.

Data rate

The rate at which data are exchanged between the tag and reader. Typical units are bits per second or bytes per second.

Data transfer rate

Number of characters which can be transmitted from a tag to a reader within a defined time. Baud rates are also used to specify how fast a reader can read information.

Data transmission rate

Unit of measurement for the volume of data transmitted within a unit of time, e.g. bytes/s, see also Baud

dB

See Decibel

dBm

Dimensional unit for the transmitted power in the logarithmic relation to 1 mW (Milliwatt).
0dBm = 1mW, +23dBm = 200mW, +30dBm = 1W.

dB

dB(relative); a relative difference to a reference value

Decibel (dB)

Unit of measurement for the logarithmic relationship between two variables.

Dense Reader Mode (DRM)

In this mode, tag readability is increased through the application of interference-reducing measures.

DRM is only defined for Gen 2 and does not function with other tag types.

Detuning

UHF antennas are tuned to receive a particular electromagnetic wavelength from the reader. If the antenna is too close to metal or a metallic material, it can be detuned, making the performance deteriorate.

Distant field communication

RFID antennas emit electromagnetic waves. If a tag is more than a full wavelength away from the reader's transmitting antenna, it is in a "distant field". If it is within a full wavelength, this is known as the "near field".

The wavelength of UHF-RFID systems is approx. 33 cm.

The distant field signal is attenuated with the square of the distance from the antenna, whereas the near field signal is attenuated with the cube of the distance from the antenna. Passive RFID systems based on distant field communication (UHF and microwave systems) have a greater read range than systems based on near field communication (typically low-frequency and high-frequency systems).

Dwell time

The dwell time is the time in which the transponder dwells within the sensing range of a reader. The reader can exchange data with the transponder during this time.

Dynamic mode

In dynamic mode, the data carrier moves past the reader at a traversing rate which depends on the configuration. Various checking mechanisms ensure error-free data transfer even under extreme environmental conditions.

EAN

European article number. Standardized barcode used in Europe, Asia and South America. Is administered by EAN International.

EBS

Equipotential **B**onding **S**trip

Effective Isotropic Radiated Power

See EIRP

Effective Radiated Power

See ERP.

EIRP

Effective Isotropic Radiated Power; unit of measurement for the transmission power of antennas (referred to an isotropic radiator) mainly used in the USA. EIRP is specified in Watt, and is not equal to ERP. (0dbi = - 2.14 dBm)

Electromagnetic compatibility (EMC)

Electromagnetic compatibility is the ability of an electrical or electronic device to operate satisfactorily in an electromagnetic environment without affecting or interfering with the environment over and above certain limits.

EMC

See Electromagnetic compatibility

EMC directive

Guidelines for electromagnetic compatibility This guideline relates to any electrical or electronic equipment, plant or system containing electric or electronic components.

EPC

See EPC global

EPC global

Electronic Product Code. Standardized number system for identifying articles with a data width of either 64, 96 or 256 bits.

Equipotential bonding

Potential differences between different parts of a plant can arise due to the different design of the plant components and different voltage levels. It is necessary to compensate for these differences by equipotential bonding: this is done by combining the equipotential bonding conductors of power components and non-power components on a centralized equalizing conductor (EBS = **E**quipotential **B**onding **S**trip).

ERP

Effective Radiated Power; unit of measurement for the transmission power of antennas (referred to an ideal dipole) mainly used in Europe. ERP is specified in Watt, and is not equal to EIRP. (0dbm = + 2.14 dBi)

ESD directive

Directive for handling **E**lectrostatic **S**ensitive **D**evelopments

ETSI

European Telecommunications Standard Institute

European Article Numbering

See EAN.

eXtensible markup language

See XML.

FCC

Federal Communications Commission (USA)

FHSS

Frequency Hopping Spread Spectrum; frequency change procedure.

FM

Frequency modulation; data are present in the changes in the frequency of the carrier frequency.

Frequency hopping

Frequency hopping technique Automatic search for free channels.

In frequency hopping, data packets are transferred between the communication partners on constantly changing carrier frequencies. This makes it possible to react to interference from devices transmitting signals in the same frequency range (channel). If an attempt to send a data packet is unsuccessful, the packet can be transmitted again on a different carrier frequency. By default the RF600 uses this procedure (FCC) only in the USA and Canada.

Frequency modulation

See FM.

Frequency Shift Keying

See FSK

FSK

Modulation, Frequency Shift Keying; data are present in the changes between two frequencies.

ICNIRP

International Commission of Non Ionizing Radiological Protection

ICRP

International Commission of Radiological Protection

Interface modules

See communication modules

Interrogator

See readers

ISO

International Standard Organization

ISO 18000

Standard for data exchange of RFID systems between reader and transponder. There are various subdefinitions of this standard for the various approved frequency ranges for RFID. For example, the range 865 ... 868 MHz is described in ISO 18000-6.

LAN

Local Area Network

LBT

Listen Before Talk; the reader only transmits when the channel is free.

License plate

10-digit code that is saved on every RFID tag. The code of the license plate establishes a connection between the item of baggage and the baggage processing system of the airport. As soon as the license plate has been read by the reader, a message is automatically sent to the baggage processing system. This message contains important data regarding the flight and destination of the item of baggage. Using this data, the item of baggage can be successfully sorted by the baggage processing system of the airport.

Limit distance

The limit distance is the maximum clear distance between reader antenna and transponder at which the transmission can still function under normal conditions.

Mass recording

The capability of a reader to record several or many transponders quasi-simultaneously and to read the code. Contrary to the multi-tag capability, the reader is not able to specifically address individual tags.

MDS

Mobile data memory, see Transponder.

MES

Manufacturing Execution System

Metal-free area

Distance/area which must be maintained between the transponder and metal in order to prevent interference during data transfer between the transponder and reader.

Mobile Data Memory (MDS)

Mobile data memory, see Transponder

Modulation

Modulation is a procedure with which one or more characteristics (e.g. phase, amplitude, frequency) of a carrier oscillation are modified according to the response of a modulating oscillation.

Multi-tag capability

Multi-tag capability means that a reader can communicate simultaneously with different data carriers. Therefore the reader can specifically address a transponder with its UID (see also mass recording).

Near field communication

RFID antennas emit electromagnetic waves. If a tag is more than a full wavelength away from the reader's transmitting antenna, it is in a "distant field". If it is within a full wavelength, this is known as the "near field".

The wavelength of UHF-RFID systems is approx. 33 cm.

The distant field signal is attenuated with the square of the distance from the antenna, whereas the near field signal is attenuated with the cube of the distance from the antenna. Passive RFID systems based on near field communication (typically low-frequency and high-frequency systems) have a greater read range than systems based on distant field communication (typically UHF and microwave systems).

Passive tag

If electromagnetic waves from the reader reach the tag antenna, the energy is converted by the antenna into electricity which provides the tag chip with current. The tag is able to return information stored on the chip. Passive tags do not usually have a battery. A battery is required if the tag has a RAM, but the battery is only used to save information in the RAM. In particular, the battery is not used for data exchange between reader and transponder.

Passive tag/transponder

A tag without its own power supply. Passive transponders obtain the energy required to supply the microchips from the radio waves they receive.

PDM

Pulse duration modulation; data are present in the pulse duration.

Phase modulation

See PM

PLC

Programmable Logic Controller, see PLC.

Programmable logic controller; electronic device used in automation engineering for open-loop and closed-loop control tasks. The typical modules of a PLC are the CPU, power supply (PS) and various input/output modules (I/O).

Programmable controller: The programmable logical controllers (PLC) of the SIMATIC S5 system consist of a central controller, one or more CPUs, and various other modules (e.g. I/O modules).

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PM

Phase modulation; data are present in the changes in carrier frequency phase.

Programmable Logic Controller

See PLC.

Programmable Logic Controllers

See PLC

Protocol

A combination of rules which manage communications systems.

Pulse duration modulation

See PDM

Radio Frequency Identification

See RFID.

Read rate

Number of tags which can be read within a defined time.

The read rate can also be used for the maximum rate at which data can be read from a tag.

The unit is bits per second or bytes per second.

Reader (also interrogator)

Readers transfer data between mobile data memories (transponders) and the higher-level systems. The data, including the energy required for processing and sending back, are transmitted to the transponder across an electromagnetic alternating field. This principle enables contact-free data transmission, ensures high industrial compatibility and works reliably in the presence of contamination or through non-metallic materials.

Reader talks first

A passive tag communicates in the read field of a reader with the reader. The reader sends energy to the tags which only reply when they are explicitly requested. The reader is able to find tags with a specific serial number commencing with either 1 or 0.

If more than one tag responds, the reader can scan all tags commencing with 01 and subsequently with 010. This is referred to as "walking" on a binary tree, or "tree walking".

Reading range

The distance within which a reader can communicate with a tag. Active tags can cover a greater distance than passive tags because they use a battery to send signals.

Reciprocity

Reciprocity means that a two-way relationship exists between the transmit and receive case of a passive antenna.

RFID

Radio Frequency Identification; a method of identifying items using electromagnetic waves. The reader supplies energy to the tag and communicates with it.

RFID systems

SIMATIC RF identification systems control and optimize material flow and production sequences. They identify reliably, quickly and economically, use non-contact data communication technology, and store data directly on the product. They are also resistant to contamination.

RH circular

Right hand circular polarization

RSSI threshold value

The "Received Signal Strength Indication" (RSSI) is an indicator of the receive field strength of the transponders. When the field strength with which the transponder is received undershoots the set RSSI threshold, the reader ignores the signal of this transponder.

The RSSI threshold value can be activated to limit areas of the antenna fields to those in which transponders should still be accessed. This can be used to avoid undesirable effects, such as range overshoot when reading transponder data.

RTNC

Connector designation (Reverse TNC). Industrial coaxial connector with screw coupling, can be used for frequencies of up to 2 GHz. The mechanical design of the RTNC connector is not compatible with the TNC connector.

RTTE

Radio and Telecommunications Terminal Equipment

SCM

Supply Chain Management

Secondary fields

In addition to the main sensing range (antenna's main direction of transmission) there are secondary fields. These secondary fields are usually smaller than the main fields. The shape and characteristics of the secondary field depend on the metallic objects in the surroundings. Secondary fields should not be used in configuring.

SELV

Safety Extra Low Voltage

Sensing range

Area in which reliable data exchange between transponder and reader is possible due to a particular minimum field strength.

SSB

Single Sideband Modulation. SSB is similar to AM (amplitude modulation), however, only one sideband is sent instead of two sidebands. This saves 50% of the spectrum required in the HF channel without affecting the signal/data rate. For RFID applications, an HF carrier must also be sent to supply energy to the tag. Sending a carrier is many times not required for other SSB applications, since the HF carrier itself does not contain any data.

Static mode

In static mode the transponder is positioned at a fixed distance (maximum: limit distance) exactly above the reader.

Tag

See transponder

Tag talks first

A passive tag communicates in the read field of a reader with the reader. When a tag reaches the field of a reader, it immediately indicates its presence by reflecting a signal.

TARI

Abbreviation of Type A Reference Interval. Duration (period) for representation of a bit with content 0.

TCP/IP

Transmission Control Protocol/Internet Protocol

Telegram cycles

A passive tag communicates in the read field of a reader with the reader. When a tag reaches the field of a reader, it immediately indicates its presence by reflecting a signal. Transmission of a read or write command is implemented in three cycles. They are called "Telegram cycles". One or two bytes of user data can be transferred with each command. The acknowledgment or response transfer (status or read data) takes place in three further cycles.

TNC

Connector designation (Threaded Neill Concelman).

Industrial coaxial connector with screw coupling, can be used for frequencies of up to 2 GHz.

Transceiver (transmitter/receiver)

Combination of transmitter and receiver. A unit which can both send and receive electromagnetic waves.

Transmission distance

Distance between communication module and transponder

Transponder

An invented word from transmitter and responder. Transponders are used on the product, the product carrier, the object, or its transport or packaging unit, and contain production and manufacturing data, i.e. all application-specific data. They follow the product through assembly lines, transfer and production lines and are used to control material flow.

Because of their wireless design, transponders can be used, if necessary, at individual work locations or manufacturing stations, where their data can be read and updated.

Tree walking

See Reader talks first.

UHF

Ultra-high frequency; frequency range from 300 MHz to 3 GHz. UHF RFID tags usually operate between 866 MHz and 960 MHz. This corresponds to a wavelength of approx. 33 cm.

UID

User IDentifier; the UID is an unambiguous number in the transponder, assigned by the manufacturer. The UID is unambiguous, and can usually also be used as a fixed code. The UID is used to specifically address a transponder

Ultra High Frequency

See UHF.

User Identifier

See UID

VESA

Video Electronics Standards Association (authority that defines standards for the PC industry)

Walking

See Reader talks first.

WLAN

Wireless LAN

writer

See readers

Writing/reading range

See transmission distance

XML

eXtensible markup language; XML is a language derived from SGML with which other languages (document types) can be described. In the meantime, XML is a widely used language for distributing information on the Internet. Data exchange between reader and read station is carried out using XML commands.

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