SIEMENS

SIMATIC

S7-1200 / S7-1500

Comparison list for programming languages based on the international mnemonics

Reference manual

Edition 12/2014

SIEMENS

Comparison list for S7-300, S7-400, S7-1200, S7-1500

Reference manual

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠**DANGER**
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠**WARNING**
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠**CAUTION**
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of SIMATIC products

Note the following:

⚠ **WARNING**
WARNING Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Comparison list for S7‑300, S7‑400, S7‑1200, S7‑1500
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Overview of the comparison list

- Measuring runtime of instructions and program parts (see below)
- Loading objects to the CPU: which changes and which changed blocks you can load to the CPU in which operating mode. (next page)
- Overview, requirements, framework conditions and legends to the comparison list (page 7)
- Comparison list for S7-300, S7-400, S7-1200, S7-1500 including CPU 150xS software controller: Which instructions and functions can be used for which controller family. (from page 8)
- Annex: Optional instructions for SIMATIC Ident

Measuring runtime of instructions and program parts

The runtime of parts of the user program and instructions depend on numerous factors. A tabular list is therefore not possible. The **RUNTIME** (runtime measurement) instruction is used to measure the runtime of the entire program, individual blocks or command sequences. The runtime measurement starts with the first call of the RUNTIME instruction and ends with the second call.

For the runtime measurement of individual instructions, you use an OB priority >15. As a result, “Monitor online” does not falsify the runtime. You can find additional information in the SIMATIC STEP 7 online help. Enter “Runtime” in the search box.

Program example in SCL:

```
“Common_Data“.opt.Last_Cycle := RUNTIME(#Tag_Memory); //Start of runtime measurement, LReal
        “speed test FB opt_DB”(ON_2:=“i1”,…);//Runtime measurement through RUNTIME
“Common_Data”.opt.Last_Cycle := RUNTIME(#Tag_Memory); //End of runtime measurement
```

The `Last_Cycle` tag contains the time that has elapsed between the previous call and the current call of RUNTIME.

Loading objects to the CPU

The table shows which changes and which changed blocks can be loaded in which operating mode.

Very complex programs can prevent loading in RUN mode. Possible solutions:

- Use a memory card with sufficient capacity.
- Select a CPU with sufficient work memory.
- Reduce the number of changed used blocks, constants, PLC tags or data types.

Changes and blocks	S7-300	S7-400	S7-1200 as of V4.0	S7-1500 V1.7	S7-1200 V1.0 - 2.1	S7-1200 V2.2 - V3.0	S7-1500 V1.0-V1.6
Changed properties of HW components	STOP	STOP	STOP	STOP	STOP	STOP	STOP
Added HW components	STOP	STOP	STOP	STOP	STOP	STOP	STOP
New/changed text lists (Alarms)	RUN	RUN	STOP	STOP	STOP	STOP	STOP
Download number of blocks	RUN (<17)	RUN (<57)	RUN (<21)	RUN	STOP	RUN (<11)	RUN
Download PLC program to device and reset	STOP (Reset)	STOP (Reset)	STOP (Reset)	STOP (Reset)	STOP (Reset)	STOP (Reset)	STOP (Reset)
New OB	RUN	RUN	STOP	RUN	STOP	STOP	RUN
Changed OB: Code changes, change of comments	RUN	RUN	RUN	RUN	STOP	RUN	RUN
OB with changed properties (e.g. cycle time change)	RUN	RUN	STOP	RUN	STOP	STOP	RUN
Deleted OB	RUN	RUN	STOP	RUN	STOP	STOP	RUN

Changes and blocks	S7-300	S7-400	S7-1200 as of V4.0	S7-1500 V1.7	S7-1200 V1.0 - 2.1	S7-1200 V2.2 - V3.0	S7-1500 V1.0-V1.6
New FB/FC/DB/PLC data type (UDT)	RUN	RUN	RUN	RUN	STOP	RUN	RUN
Deleted FB/FC/DB/PLC data type (UDT)	RUN	RUN	RUN	RUN	STOP	RUN	RUN
Changed FB/FC: Code change, change of comments	RUN	RUN	RUN	RUN	STOP	RUN	RUN
Changed FB/FC: Interface change	STOP	STOP	RUN (Init)	RUN (Init)	STOP	STOP	RUN (Init)
Changed DB (no memory reserve configured): Name/type of tags changed, tags added or deleted	RUN (Init)	RUN (Init)	RUN (Init)	RUN (Init)	STOP	STOP	RUN (Init)
Changed DB (memory reserve configured): New tags added	--	--	RUN	RUN	--	--	RUN (Init)
Changed PLC data type (UDT)	STOP	STOP	RUN (Init)	RUN (Init)	STOP	STOP	RUN (Init)
Changed PLC tags (added, deleted, name changed)	RUN	RUN	RUN	RUN	STOP	STOP	RUN

Changes and blocks	S7-300	S7-400	S7-1200 as of V4.0	S7-1500 V1.7	S7-1200 V1.0 - 2.1	S7-1200 V2.2 - V3.0	S7-1500 V1.0-V1.6
Changed retentivity settings (bit memory area, DB area)	STOP	STOP	STOP	STOP	STOP	STOP	STOP
Motion Control technology objects: Changes to MC servo cycle clock, change from asynchronous to cyclic (and vice-versa). Changes to the HW interface of the TO	--	--	--	STOP	--	--	STOP

(init) means that the current values of the DBs are overwritten by start values during loading.

Structure of the comparison list

- Basic instructions
  Instructions that you often use such as bit logic operations, timers, counters, mathematic functions
- Extended instructions
  Sophisticated instructions for more options, such as date and time, interrupts, alarms, PROFIenergy
- Technological instructions (technology)
  Technological functions, such as PID control, Motion
- Instructions for communication (communication)
  Instructions for communication, e.g. S7 Communication, Open User Communication

Validity and framework conditions

- SIMATIC STEP 7 as of Version 13, as of service pack 1
- The contents of the S7-1500 column are valid also for SIMATIC S7-1500 Software Controller CPU 150xS
- SIMATIC S7-1200 as of firmware 3.x; SIMATIC S7-1200 supports only LAD, FBD and SCL.
- STL: you have to call some instructions via CALL.

Legend

✔	Applicable
(✔)	Applicable with limitations
nn	Not necessary
gray	We recommend that you do not use the grayed out instructions in the S7-1200 or S7-1500, as these instructions are unsuitable for symbolic addressing or multiple instances. SIMATIC counters and timers are not recommended, as they are not multi-instance capable.
Xyz	New instruction as of SIMATIC STEP 7 V13. For this purpose, SIMATIC S7-1200 requires at least firmware 4.0 and SIMATIC S7-1500 at least firmware 1.5
Xyz	New instruction as of SIMATIC STEP 7 V13 **SP1**. For this purpose, SIMATIC S7-1200 requires at least firmware 4.1 and SIMATIC S7-1500 at least firmware 1.7
Xyz	Also available as safety instruction in the optional safety package in LAD and FBD.

Instructions in the section "Basic instructions"

Instruction groups	Page	Instruction groups	Page	Instruction groups	Page
General	8	Comparator operations	13	Word logic operations	27
Bit logic operations	8	Math functions	16	Shift and rotate instructions	27
Safety functions	10	Move	17	Load and transfer	28
Timers	11	Conversion operations	20	Legacy	29
Counters	13	Program control operations	23		

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
General								
✓	✓	✓	✓	Insert network	✔		✔	nn
✓	✓	✓	✓	Insert empty box	✔		nn	nn
✓	✓	✓	✓	Open branch	✔		(	
✓	✓	✓	✓	Close branch	✔		)	
✓	✓	✓	✓	Insert input	-|		nn	nn
✓	✓	✓	✓	Invert Boolean result	-|NOT|-	-o|	NOT	
Bit logic operations								
✓	✓	✓	✓	AND logic operation	✔	&	A	&

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
✓	✓	✓	✓	OR logic operation	✔	>=1	O	OR
✓	✓	✓	✓	EXCLUSIVE or operation	✔	X	X	XOR
✓	✓	✓	✓	Assignment	-( )-	-[=]	=	:=
		✓	✓	Negate assignment	-(/)-	-[/=]	NOT	
✓	✓	✓	✓	Reset output	-(R)	-[R]	R	nn
✓	✓	✓	✓	Set output	-(S)	-[S]	S	nn
		✓	✓	*Set bit field*	*SET_BF*		*nn*	*nn*
		✓	✓	*Reset bit field*	*RESET_BF*		*nn*	*nn*
✓	✓	✓	✓	Set/reset flip-flop	SR		nn	nn
✓	✓	✓	✓	Reset/set flip-flop	RS		nn	nn
✓	✓	✓	✓	Scan operand for positive signal edge	-|P|-		<Operand>; FP;	nn
✓	✓	✓	✓	Scan operand for negative signal edge	-|N|-		<Operand>; FP;	nn
		✓	✓	Set operand on positive signal edge	-(P)-		R_TRIG	
		✓	✓	Set operand on negative signal edge	-(N)-		F_TRIG	
✓	✓	✓	✓	Scan Boolean result for positive signal edge	P_TRIG		FP	nn
✓	✓	✓	✓	Scan Boolean result for negative signal edge	N_TRIG		FN	nn

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
		✓	✓	Set tag on positive signal edge	R_TRIG			
		✓	✓	Set tag on negative signal edge	F_TRIG			
✓	✓	✓	✓	Normally open contact	-||-	nn	nn	nn
✓	✓	✓	✓	Normally closed contact	-|/|-	nn	nn	nn
				Safety functions				
✓	✓	✓	✓	Safety only: EMERGENCY STOP up to Stop category 1	ESTOP1			
✓	✓			Safety only: Two-hand monitoring	TWO_HAND			
✓	✓	✓	✓	Safety only: Two-hand monitoring with enable	TWO_H_EN			
✓	✓			Safety only: Parallel muting with two or four muting sensors	MUTING			
✓	✓	✓	✓	Safety only: Parallel muting with two or four muting sensors	MUT_P			
✓	✓	✓	✓	Safety only: 1oo2 (2v2) evaluation of two single-channel encoders combined with a discrepancy analysis	EV1oo2DI			
✓	✓	✓	✓	Safety only: Feedback monitoring	FDBACK			
✓	✓	✓	✓	Safety only: Safety door monitoring	SFDOOR			

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
✓	✓	✓	✓	Safety only: Acknowledgment for simultaneous reintegration of all F-I/O / channels of the F-I/O of an F-runtime group after communication errors and/or F-I/O / channel errors	ACK_GL			
				Timers				
				IEC timers				
✓	✓	✓	✓	Generate pulse	TP		TP	
✓	✓	✓	✓	Generate on-delay	TON		TON	
✓	✓	✓	✓	Generate off-delay	TOF		TOF	
		✓	✓	Time accumulator	TONR			
		✓	✓	Time accumulator (start timer)	-(TONR)-	-[TONR]-	nn	nn
		✓	✓	Reset timer	-(RT)-	-[RT]-	RESET_TIMER	
		✓	✓	Load time duration	-(PT)-	-[PT]-	PRESET_TIMER	
		✓	✓	Generate pulse	-(TP)-	-[TP]-	nn	TP
		✓	✓	Start on-delay timer	-(TON)-	-[TON]-	SD	S_ODT
		✓	✓	Start off-delay timer	-(TOF)-	-[TOF]-	SF	S_OFFDT

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
				Legacy				
✓	✓		✓	*Assign pulse timer parameters and start*	*S_PULSE*		*nn*	*S_PULSE*
✓	✓		✓	*Assign extended pulse timer parameters and start*	*S_PEXT*		*nn*	*S_PEXT*
✓	✓		✓	*Assign on-delay timer parameters and start*	*S_ODT*		*nn*	*S_ODT*
✓	✓		✓	*Assign retentive on-delay timer parameters and start*	*S_ODTS*		*nn*	*S_ODTS*
✓	✓		✓	*Assign off-delay timer parameters and start*	*S_OFFDT*		*nn*	*S_OFFDT*
✓	✓		✓	*Start pulse timer*	*-(SP)*	*-[SP]*	*SP*	*nn*
✓	✓		✓	*Start extended pulse timer*	*-(SE)*	*-[SE]*	*SE*	*nn*
✓	✓		✓	*Enable timer*			*FR*	*nn*
✓	✓		✓	*Load timer value*			*L*	*nn*
✓	✓		✓	*Load BCD-coded timer value*			*LC*	*nn*
✓	✓		✓	*Reset timer*	*-(R)*	*-[R]*	*R*	*nn*
✓	✓		✓	*Start on-delay timer*	*-(SD)*	*-[SD]*	*SD*	*nn*
✓	✓		✓	*Start retentive on-delay timer*	*-(SS)*	*-[SS]*	*SS*	*nn*

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
				Counters				
				IEC counters				
✓	✓	✓	✓	Count up	CTU		CTU	
✓	✓	✓	✓	Count down	CTD		CTD	
✓	✓	✓	✓	Count up and down	CTUD		CTUD	
				Legacy				
✓	✓		✓	*Assign parameters and count up*	*S_CU*		*nn*	*S_CU*
✓	✓		✓	*Assign parameters and count down*	*S_CD*		*nn*	*S_CD*
✓	✓		✓	*Assign parameters and count up / down*	*S_CUD*		*nn*	*S_CUD*
✓	✓		✓	*Set counter value*	*-(SC)*	*-[SC]*	*nn*	*nn*
✓	✓		✓	*Count up*	*-(CU)*	*-[CU]*	*CU*	*nn*
✓	✓		✓	*Count down*	*-(CD)*	*-[CD]*	*CD*	*nn*
✓	✓		✓	*Enable counter*			*FR*	*nn*
✓	✓		✓	*Load counter*			*L*	*nn*
✓	✓		✓	*Load BCD-coded counter value*			*LC*	*nn*
✓	✓		✓	*Reset counter*			*R*	*nn*
✓	✓		✓	*Set counter*			*S*	*nn*
				Comparator operations				
✓	✓	✓	✓	Equal	CMP ==		== I/D/R	=
✓	✓	✓	✓	Not equal	CMP <>		<> I/D/R	<>

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Greater or equal	CMP >=	>= I/D/R	>=
✓	✓	✓	✓	Less or equal	CMP <=	<= I/D/R	<=
✓	✓	✓	✓	Greater than	CMP >	> I/D/R	>
✓	✓	✓	✓	Less than	CMP >	> I/D/R	<
		✓	✓	Value within range	IN_RANGE		nn
		✓	✓	Value outside range	OUT_RANGE		nn
		✓	✓	Check validity	-|OK|-		nn
		✓	✓	Check invalidity	-|NOT_OK|-		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Variant			
		✓	✓	Check data type of a VARIANT tag			TypeOf
		✓	✓	Check data type of an ARRAY element of a VARIANT tag			TypeOfElements
		✓	✓	Compare data type for EQUAL with the data type of a tag	EQ_Type		*)
		✓	✓	Compare data type of an ARRAY element for EQUAL with the data type of a tag	EQ_ElemType		*)
		✓	✓	Compare data type for UNEQUAL with the data type of a tag	NE_Type		*)
		✓	✓	Compare data type of an ARRAY element for UNEQUAL with the data type of a tag	NE_ElemType		*)
		✓	✓	Check for EQUALS NULL pointer	IS_NULL		*)
		✓	✓	Check for UNEQUALS NULL pointer	NOT_NULL		*)

*) Application examples for SCL:
IF TypeOf(...) = INT THEN ... // corresponds to EQ_Type
IF TypeOfElements(...) = INT THEN ... // corresponds to EQ_ElemType
IF ... <> NULL THEN ... // corresponds to NOT_NULL
Other operators can also be used instead of “=”, for example: “<>”.
Instead of “INT” you can also use any other data types or data types that you have defined, for example: “REAL”, “Recipe”.

		✓	✓	Check for array	IS_ARRAY		

Basic instructions				Extended instructions	Technology	Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Math functions			
		✓	✓	Calculate	CALCULATE	nn	nn
✓	✓	✓	✓	Add	ADD	+	+
✓	✓	✓	✓	Subtract	SUB	-	-
✓	✓	✓	✓	Multiply	MUL	*	*
✓	✓	✓	✓	Divide	DIV	/	/
✓	✓	✓	✓	Return remainder of division	MOD		
✓	✓	✓	✓	Create twos complement	NEG	NEGI, NEGD	nn
✓	✓	✓	✓	Create ones complement		INVI, INVD	nn
✓	✓	✓	✓	Increment	INC		nn
✓	✓	✓	✓	Decrement	DEC		nn
✓	✓	✓	✓	Form absolute value	ABS		
✓	✓	✓	✓	Get minimum	MIN		
✓	✓	✓	✓	Get maximum	MAX		
✓	✓	✓	✓	Set limit value	LIMIT		
✓	✓	✓	✓	Form square	SQR		
✓	✓	✓	✓	Form square root	SQRT		
✓	✓	✓	✓	Form natural logarithm	LN		
✓	✓	✓	✓	Form exponential value	EXP		
✓	✓	✓	✓	Form sine value	SIN		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Form cosine value	COS		
✓	✓	✓	✓	Form tangent value	TAN		
✓	✓	✓	✓	Form arcsine value	ASIN		
✓	✓	✓	✓	Form arccosine value	ACOS		
✓	✓	✓	✓	Form arctangent value	ATAN		
		✓	✓	Return fraction	FRAC		FRAC
		✓	✓	Exponentiate	EXPT	**	**
				Move			
(✓)	(✓)	✓	✓	Move value S7-300/400: Only LAD and FBD	MOVE	MOVE	:=
✓	✓			Safety only: Write value indirectly to an F-DB	WR_FBD		
✓	✓			Safety only: Read value indirectly from an F-DB	RD_FBD		
		✓	✓	Move data type from ARRAY of BYTE (deserialize)	Deserialize		
		✓	✓	Move data type to ARRAY of BYTE (serialize)	Serialize		
		✓	✓	Move block	MOVE_BLK		
		✓	✓	Move block uninterruptible	UMOVE_BLK		
		✓	✓	Move block	MOVE_BLK_VARIANT		
		✓	✓	Fill block	FILL_BLK		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
		✓	✓	Do not fill block uninterruptible	UFILL_BLK		
		✓	✓	Swap	SWAP		
				ARRAY DB			
		✓	✓	Read from ARRAY data block	ReadFromArrayDB		
		✓	✓	Write to ARRAY data block	WriteToArrayDB		
		✓	✓	Read from ARRAY data block in load memory	ReadFromArrayDBL		
		✓	✓	Write to ARRAY data block in load memory	WriteToArrayDBL		
				Variant			
		✓	✓	Read out VARIANT tag value	VariantGet		
		✓	✓	Write VARIANT tag value	VariantPut		
		✓	✓	Get number of ARRAY elements	CountOfElements		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Read/write access Recommendation: program symbolically			
		✓	✓	Read data in little-endian format		READ_LITTLE	
		✓	✓	Write data in little-endian format		WRITE_LITTLE	
		✓	✓	Read data in big-endian format		READ_BIG	
		✓	✓	Write data in big-endian format		WRITE_BIG	
		✓	✓	*Read memory address*		*PEEK*	
		✓	✓	*Read memory bit*		*PEEK_BOOL*	
		✓	✓	*Write memory address*		*POKE*	
		✓	✓	*Write memory bit*		*POKE_BOOL*	
		✓	✓	*Write memory area*		*POKE_BLK*	
				Legacy *Recommendation: Program symbolically*			
✓	✓		✓	*Move block*	*BLKMOV*		
✓	✓		✓	*Move block uninterruptible*	*UBLKMOV*		
✓	✓		✓	*Fill block*	*FILL*		
		✓	✓	*Read field* *Recommendation: indexed access to an array*	*FieldRead*		
		✓	✓	*Write field* *Recommendation: indexed access to an array*	*FieldWrite*		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
Conversion operations							
✓	✓	(✓)	✓	Convert value S7-1200/1500: is applied implicitly and therefore generally not necessary. S7-1200: not as Safety instruction	CONVERT	CONVERT	
✓	✓	✓	✓	Safety only: Convert data from BOOL data type to data of WORD data type	BO_W		
✓	✓	✓	✓	Safety only: Convert data from BOOL data type to data of WORD data type	W_BO		
✓	✓	✓	✓	Round numerical value	ROUND	RND	ROUND
✓	✓	✓	✓	Generate next higher integer from floating-point number	CEIL	RND+	CEIL
✓	✓	✓	✓	Generate next lower integer from floating-point number	FLOOR	RND-	FLOOR
✓	✓	✓	✓	Truncate numerical value	TRUNC		
		✓	✓	Scale	SCALE_X		
		✓	✓	Normalize	NORM_X		
✓	✓		✓	Convert BCD to integer (16 bit)	nn	BTI	BCD16_TO_INT
✓	✓		✓	Convert integer (16 bit) to BCD	nn	ITB	INT_TO_BCD16
✓	✓		✓	Convert BCD to integer (32 bit)	nn	BTD	BCD32_TO_INT

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Convert integer (32 bit) to BCD	nn	DTB	DINT_TO_BCD32
✓	✓	✓	✓	Convert integer (16 bit) to integer (32 bit) S7-1500: The conversion is also performed implicitly	nn	ITD	INT_TO_DINT
✓	✓	✓	✓	Convert integer (32 bit) to floating-point number; S7-1500: The conversion is also performed implicitly	nn	DTR	DINT_TO_REAL
		✓	✓	You can generally convert number formats and data types into other number formats and data types. For additional information, refer to the STEP 7 information system	CONVERT		xxx_TO_yyy
✓	✓		✓	Create ones complement integer (16 bit) S7-1500: The conversion is also performed implicitly	nn	INVI	nn
✓	✓		✓	Create ones complement double integer (32 bit); S7-1500: The conversion is also performed implicitly	nn	INVD	nn
✓	✓		✓	Negate integer (16 bit)	nn	NEGI	nn
✓	✓		✓	Negate integer (32 bit)	nn	NEGD	nn
✓	✓		✓	Negate floating-point number	nn	NEGR	nn

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Switch bytes in the right word of accumulator 1	nn	CAW	nn
✓	✓		✓	Switch all bytes in accumulator 1	nn	CAD	nn
				Variant			
		✓		Convert VARIANT to DB_ANY		VARIANT_TO_DB_ANY	
		✓		Convert DB_ANY to VARIANT		DB_ANY_TO_VARIANT	
				Legacy *Recommendation: Program symbolically*			
✓	✓		✓	*Convert integer into a floating-point number which is scaled in physical units between a low and a high limit (scale).*	*SCALE*	*SCALE*	
✓	✓		✓	*Unscale floating-point number into physical units between a low and a high limit and convert into an integer (unscale).*	*UNSCALE*		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
Program control operations							
✓	✓	✓	✓	Run conditionally			IF… THEN…
✓	✓	✓	✓	Branch conditionally			IF… THEN… ELSE…
✓	✓	✓	✓	Branch conditionally multiple times			IF… THEN… ELSIF…
✓	✓	✓	✓	Create multiway branch, execute conditionally			CASE… OF…
✓	✓	✓	✓	Run in counting loop			FOR… TO… DO…
✓	✓	✓	✓	Run in counting loop with step width			FOR… TO… BY… DO…
✓	✓	✓	✓	Run if condition is met			WHILE… DO…
✓	✓	✓	✓	Run if condition is not met			REPEAT… UNTIL…
✓	✓	✓	✓	Recheck loop condition			CONTINUE
✓	✓	✓	✓	Exit loop immediately			EXIT
✓	✓	✓	✓	Exit block	RET	BEU	RETURN
✓	✓		✓	Conditional block end		BEC	nn
✓	✓	✓	✓	Inserting a comment section		//	//, (*…*)
			✓	Only SIMATIC S7-1500 Software Controller CPU 150xS: Shut down or restart Windows and the controller		SHUT_DWN	

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
Jumps								
✓	✓	✓	✓	*Jump*				*GOTO...*
✓	✓	✓	✓	Jump if RLO = 1	-(JMP)	-[JMP]	JC	nn
✓	✓	✓	✓	Jump if RLO = 0	-(JMPN)	-[JMPN]	JCN	nn
✓	✓	✓	✓	Jump label	LABEL		:	nn
		✓	✓	Define jump list	JMP_LIST		JL	nn
		✓	✓	Jump distributor	SWITCH			nn
✓	✓	✓	✓	Return	-(RET)	-[RET]		nn
✓	✓			Safety only: Open global data block	-(OPN)	-[OPN]		nn
✓	✓			Safety only: Open instance data block	-(OPNI)	-[OPNI]		nn
✓	✓		✓	Unconditional jump			JU	nn
✓	✓		✓	Jump if RLO = 1 and save RLO	nn		JCB	nn
✓	✓		✓	Jump if RLO = 0 and save RLO	nn		JNB	nn
✓	✓		✓	Jump if BR = 1	nn		JBI	nn
✓	✓		✓	Jump if BR = 0	nn		JNBI	nn
✓	✓		✓	Jump if OV = 1	nn		JO	nn
✓	✓		✓	Jump if OS = 1	nn		JOS	nn
✓	✓		✓	Jump if the result is zero	nn		JZ	nn
✓	✓		✓	Jump if the result is not zero	nn		JN	nn
✓	✓		✓	Jump if the result is greater than zero	nn		JP	nn

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Jump if the result is less than zero	nn	JM	nn
✓	✓		✓	Jump if the result is greater than or equal to zero	nn	JPZ	nn
✓	✓		✓	Jump if the result is less than or equal to zero	nn	JMZ	nn
✓	✓		✓	Jump if the result is invalid	nn	JUO	nn
✓	✓		✓	Loop	nn	LOOP	nn
				Data blocks			
✓	✓		✓	Open data block in DB register		OPN	nn
✓	✓		✓	Open data block in DI register		OPNI	nn
✓	✓		✓	*Swap data block register*		*CDB*	*nn*
✓	✓		✓	*Load the length of a global data block into accumulator 1*		*L DBLG*	*nn*
✓	✓		✓	*Load the number of a global data block into accumulator 1*		*L DBNO*	*nn*
✓	✓		✓	*Load the length of an instance data block into accumulator 1*		*L DILG*	*nn*
✓	✓		✓	*Load the number of an instance data block into accumulator 1*		*L DINO*	*nn*

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Code blocks			
✓	✓		✓	Call block LAD / FBD: only with S7-300/400	CALL		nn
✓	✓		✓	*Conditional block call*		*CC*	*nn*
✓	✓		✓	*Unconditional block call*		*UC*	*nn*
				Runtime control			
		✓	✓	Limit and enable password legitimation	ENDIS_PW		
✓	✓	✓	✓	Restart cycle monitoring time	RE_TRIGR		
✓	✓	✓	✓	Exit program	STP		
		✓	✓	Get error locally	GET_ERROR		
		✓	✓	Get error ID locally	GET_ERR_ID		
✓	✓			Compress CPU memory	COMPRESS		
✓	✓			Control CiR process	CiR		
		✓	✓	Initialize all retain data	INIT_RD		
✓	✓	✓	✓	Configure time delay	WAIT		
✓	✓			Change protection level	PROTECT		
		✓	✓	Measure program runtime LAD and FBD: new	RUNTIME		
✓	✓	✓	✓	Safety only: Fail-safe acknowledgment from an operator control and monitoring system	F_ACK_OP		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
Word logic operations							
✓	✓	✓	✓	Create ones complement	INVERT		nn
✓	✓	✓	✓	Decode	DECO		
✓	✓	✓	✓	Encode	ENCO		
✓	✓	✓	✓	Select	SEL		
✓	✓	✓	✓	Multiplex S7-300/400: SCL only	MUX		
		✓	✓	Demultiplex	DEMUX		
✓	✓	✓	✓	AND logic operation word by word	AND	AW	AND, &
✓	✓	✓	✓	OR logic operation word by word	OR	OW	OR
✓	✓	✓	✓	EXCLUSIVE OR logic operation word by word	XOR	XOW	XOR
✓	✓	✓	✓	AND logic operation double word by double word	AND	AD	AND, &
✓	✓	✓	✓	OR logic operation double word by double word	OR	OD	OR
✓	✓	✓	✓	EXCLUSIVE OR logic operation double word by double word	XOR	XOD	XOR
Shift and rotate instructions							
✓	✓	✓	✓	Rotate right	ROR		
✓	✓	✓	✓	Rotate left	ROL		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Shift right word by word	SHR	SRW	SHR
✓	✓	✓	✓	Shift left word by word	SHL	SLW	SHL
✓	✓		✓	Shift word by word with sign		SSI	nn
✓	✓		✓	Shift double word by double word with sign		SSD	nn
✓	✓		✓	Shift right double word by double word		SRD	nn
✓	✓		✓	Shift left double word by double word		SLD	nn
✓	✓		✓	Rotate right double word by double word	SHR	RRD	SHR
✓	✓		✓	Rotate left double word by double word	SHL	RLD	SHL
✓	✓		✓	Rotate left by status bit CC 1		RLDA	nn
✓	✓		✓	Rotate right by status bit CC 1		RRDA	nn
				Load and transfer the registers in STL			
				Load			
✓	✓		✓	Load	nn	L	nn
✓	✓		✓	*Load status word in accumulator 1*		*L STW*	*nn*
✓	✓		✓	*Load AR1 with contents of accumulator 1*		*LAR1*	*nn*
✓	✓		✓	*Load AR1 with double word or area pointer*		*LAR1 <D>*	*nn*
✓	✓		✓	*Load AR1 with contents of AR2*		*LAR1 AR2*	*nn*
✓	✓		✓	*Load AR2 with contents of accumulator 1*		*LAR2*	*nn*
✓	✓		✓	*Load AR2 with double word or area pointer*		*LAR2 <D>*	*nn*

Basic instructions				Extended instructions	Technology	Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Transfer			
✓	✓		✓	Transfer	nn	T	nn
✓	✓		✓	*Transfer accumulator 1 to status word*		*T STW*	*nn*
✓	✓		✓	*Switch AR1 and AR2*		*CAR*	*nn*
✓	✓		✓	*Transfer AR1 to accumulator 1*		*TAR1*	*nn*
✓	✓		✓	*Transfer AR1 to double word*		*TAR1 <D>*	*nn*
✓	✓		✓	*Transfer AR1 to AR2*		*TAR1 AR2*	*nn*
✓	✓		✓	*Transfer AR2to accumulator 1*		*TAR2*	*nn*
✓	✓		✓	*Transfer AR2 to double word*		*TAR2 <D>*	*nn*
				Legacy			
✓	✓		✓	Implement sequencer	DRUM		
✓	✓			Implement sequencer	DRUM_X		
✓	✓		✓	Discrete control-timer alarm	DCAT		
✓	✓		✓	Motor control-timer alarm	MCAT		
✓	✓		✓	Compare input bits with the bits of a mask	IMC		
✓	✓		✓	Compare scan matrix	SMC		
✓	✓		✓	Lead and lag algorithm	LEAD_LAG		
✓	✓		✓	Create bit pattern for seven-segment display	SEG		
✓	✓		✓	Create tens complement	BCDCPL		
✓	✓		✓	Count number of set bits	BITSUM		

Basic instructions				Extended instructions	Technology		Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
✓	✓			Time accumulator	TONR_X			
✓	✓			Save data to shift register	WSR			
✓	✓			Shift bit to shift register	SHRB			
✓	✓			*Get status bit*	*Status -||-*		*A 0V*	*nn*
✓	✓			*Call block*	*-(CALL)*	*-[CALL]*	*UC*	*nn*
✓	✓			*Save RLO in BR bit*	*-(SAVE)*	*-[SAVE]*	*SAVE*	*nn*
✓	✓			*Open MCR ranges*	*-(MCR<)*	*-[MCR<]*	*MCR(*	*nn*
✓	✓			*Close MCR ranges*	*-(MCR>)*	*-[MCR>]*	*)MCR*	*nn*
✓	✓			*Enable MCR range*	*-(MCRA)*	*-[MCRA]*	*MCRA*	*nn*
✓	✓			*Disable MCR range*	*-(MCRD)*	*-[MCRD]*	*MCRD*	*nn*
✓	✓			*Set bit array*	*SET*			
✓	✓			*Set byte array*	*SETI*			
✓	✓			*Reset bit array*	*RESET*			
✓	✓			*Reset byte array*	*RESETI*			
✓	✓			*Enter substitute value*	*REPL_VAL*			
✓	✓		✓	*Swap content of accumulators 1 and 2*	*nn*		*TAK*	*nn*
✓	✓		✓	*Shift content to the next higher accumulator*	*nn*		*PUSH*	*nn*
✓	✓		✓	*Shift content to the next lower accumulator*	*nn*		*POP*	*nn*
✓	✓		✓	*Add accumulator 1 to AR1*	*nn*		*+AR1*	*nn*
✓	✓		✓	*Add accumulator 1 to AR2*	*nn*		*+AR2*	*nn*

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	*Program display (null instruction)*	*nn*	*BLD*	*nn*
✓	✓		✓	*Null instruction*	*nn*	*NOP 0*	*nn*
✓	✓		✓	*Null instruction*	*nn*	*NOP 1*	*nn*

Instructions in the section "Advanced instructions"

Instruction groups	Page	Instruction groups	Page	Instruction groups	Page
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S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Date and time			
✓	✓		✓	Compare time tags	T_COMP*		
✓	✓	✓	✓	Convert times and extract	T_CONV*		
✓	✓	✓	✓	Add times	T_ADD*		
✓	✓	✓	✓	Subtract times	T_SUB*		
✓	✓	✓	✓	Time difference	T_DIFF*		
✓	✓		✓	Combine times	T_COMBINE*		

* SCL: Use conversion functions x_TO_y (z. B. TIME_TO_DINT) or comparator and math functions (e.g. +, -, >, <).

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Time-of-day functions			
✓	✓	✓	✓	Set time-of-day	WR_SYS_T		
✓	✓	✓	✓	Read time-of-day	RD_SYS_T		
		✓	✓	Read local time	RD_LOC_T		
		✓	✓	Write local time	WR_LOC_T		
			✓	Synchronize slave clocks	SNC_RTCB		
✓	✓		✓	Read system time	TIME_TCK		
		✓	✓	Set time zone	SET_TIMEZONE		
✓	✓	✓	✓	Runtime meters	RTM		
✓	✓			Set runtime meters	SET_RTM		
✓	✓			Start and stop runtime meters	CTRL_RTM		
✓	✓			Read runtime meters	READ_RTM		
	✓			Set time-of-day and time-of-day status	SET_CLKS		
	✓		✓	Synchronize slave clocks	SNC_RTCB		
				Local time			
✓	✓			Calculate local time	LOC_TIME		
✓	✓			Calculate local time from base time	BT_LT		
✓	✓			Calculate base time from local time	LT_BT		
✓	✓			Set time-of-day interrupt using local time	S_LTINT		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓			Set daylight saving time/standard time without time-of-day status	SET_SW		
✓	✓			Transfer time-stamped alarms	TIMESTMP		
	✓			Set daylight saving time/standard time with time-of-day status	SET_SW_S		
				String and Character			
		✓	✓	Move character string	S_MOVE	:=	
✓	✓		✓	Compare character strings	S_COMP	=	
✓	✓	✓	✓	Convert character string	S_CONV		
		✓	✓	Convert character string to numerical value	STRG_VAL	STRG_...	
		✓	✓	Convert numerical value to character string	VAL_STRG	..._STRG	
		✓	✓	Convert character string to Array of CHAR	Strg_TO_Chars		
		✓	✓	Convert Array of CHAR to character string	Chars_TO_Strg		
		✓	✓	Determine the maximum length of a character string	MAX_LEN		
			✓	Join multiple character strings	JOIN		
			✓	Split character array in multiple strings	SPLIT		
✓	✓	✓	✓	Convert ASCII string to hexadecimal number (conv-ersion is included in the conversion functions, e.g. CHAR_TO_WORD)	ATH		
✓	✓	✓	✓	Convert hexadecimal number to ASCII string	HTA		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Additional instructions			
✓	✓	✓	✓	Determine the length of a character string	LEN		
✓	✓	✓	✓	Combine character strings	CONCAT		
✓	✓	✓	✓	Read the left characters of a character string	LEFT		
✓	✓	✓	✓	Read the right characters of a character string	RIGHT		
✓	✓	✓	✓	Read the middle characters of a character string	MID		
✓	✓	✓	✓	Delete characters in a character string	DELETE		
✓	✓	✓	✓	Insert characters in a character string	INSERT		
✓	✓	✓	✓	Replace characters in a character string	REPLACE		
✓	✓	✓	✓	Find characters in a character string	FIND		
				Runtime information			
		✓	✓	Read out name of a tag in the input parameter	GetSymbolName		
			✓	Query combined global name of input parameter assignment	GetSymbolPath		
		✓	✓	Read out name of the block instance	GetInstanceName		
			✓	Query combined global name of the block instance	GetInstancePath		
		✓	✓	Read out name of the block	GetBlockName		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Process image			
	✓		✓	Update the process image inputs	UPDAT_PI		
	✓		✓	Update the process image outputs	UPDAT_PO		
✓	✓		✓	Synchronize the process image inputs	SYNC_PI		
✓	✓		✓	Synchronize the process image outputs	SYNC_PO		
				Distributed I/O			
				DP & PROFINET			
✓	✓	✓	✓	Read data record	RDREC		
✓	✓	✓	✓	Write data record	WRREC		
✓	✓		✓	Read process image	GETIO		
✓	✓		✓	Transfer process image	SETIO		
✓	✓		✓	Read process image area	GETIO_PART		
✓	✓		✓	Transfer process image area	SETIO_PART		
✓	✓	✓	✓	Receive interrupt	RALRM		
✓	✓		✓	Enable/disable DP slaves	D_ACT_DP		
			✓	Reconfigure IO system To do this, switch modules on or off in order to, for example, flexibly run through or bridge the production steps of a manufacturing process.	ReconfigIOSystem		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Additional instructions			
✓	✓		✓	Read data record from I/O	RD_REC		
✓	✓		✓	Write data record to I/O	WR_REC		
✓	✓	✓	✓	Read consistent data of a DP standard slave	DPRD_DAT		
✓	✓	✓	✓	Write consistent data of a DP standard slave	DPWR_DAT		
				iDevice / iSlave			
✓			✓	Receive data record	RCVREC		
✓			✓	Make data record available	PRVREC		
✓				Send interrupt	SALRM		
				PROFIBUS			
✓	✓			Trigger hardware interrupt from DP standard slave	DP_PRAL		
✓	✓		✓	Synchronize DP slaves / Freeze inputs	DPSYC_FR		
✓	✓	✓	✓	Read diagnostics data from a DP slave	DPNRM_DG		
✓	✓		✓	Determine topology for DP master system	DP_TOPOL		
				ASi			
✓	✓			Control ASi master behavior	ASi_3422		
✓	✓		✓	Control ASi master behavior	ASI_CTRL		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PROFIenergy			
				IO controller			
✓	✓		✓	Start and exit energy-saving mode	PE_START_END		
✓	✓		✓	Start and exit energy-saving mode / Read out status information	PE_CMD		
✓	✓		✓	Set the switching response of the power modules	PE_DS3_WRITE_ET200S		
✓	✓		✓	Start and exit energy-saving mode using WakeOnLan	PE_WOL		
				iDevice / iSlave			
✓			✓	Control PROFIenergy commands in the I-Device	PE_I_DEV		
✓			✓	Generate negative answer to command	PE_Error_RSP		
✓			✓	Generate answer to command at start of pause	PE_Start_RSP		
✓			✓	Generate answer to command at end of pause	PE_End_RSP		
✓			✓	Generate queried energy savings modes as answer	PE_List_Modes_RSP		
✓			✓	Generate queried energy data as answer	PE_Get_Mode_RSP		
✓			✓	Generate PEM status as answer	PE_PEM_Status_RSP		
✓			✓	Generate number of PROFIenergy commands as answer	PE_Identify_RSP		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓			✓	Generate list of supported measured values as answer	PE_Measurement_List_RSP		
✓			✓	Generate queried measured values as answer	PE_Measurement_Value_RSP		
				Module parameter assignment			
✓	✓		✓	Read module data record	RD_DPAR		
✓			✓	Read module data record asynchronously	RD_DPARA		
✓	✓			Transfer module data records	PARM_MOD		
	✓		✓	Read data record from configured system data	RD_DPARM		
✓	✓			Write module data record	WR_PARM		
✓	✓		✓	Transfer data record	WR_DPARM		
				Interrupts			
		✓	✓	Attach an OB to an interrupt event	ATTACH		
		✓	✓	Detach an OB from an interrupt event	DETACH		
				Cyclic interrupt			
		✓	✓	Set cyclic interrupt parameters	SET_CINT		
		✓	✓	Query cyclic interrupt parameters	QRY_CINT		
				Time-of-day interrupt			
✓	✓	✓	✓	Set time-of-day interrupt	SET_TINT		
			✓	Set time-of-day interrupt	SET_TINTL		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Cancel time-of-day interrupt	CAN_TINT		
✓	✓	✓	✓	Enable time-of-day interrupt	ACT_TINT		
✓	✓	✓	✓	Query status of time-of-day interrupt	QRY_TINT		
				Time-delay interrupt			
✓	✓	✓	✓	Start time-delay interrupt	SRT_DINT		
✓	✓	✓	✓	Cancel time-delay interrupt	CAN_DINT		
✓	✓	✓	✓	Query time-delay interrupt status	QRY_DINT		
				Synchronous error events			
✓	✓		✓	Mask synchronous error events	MSK_FLT		
✓	✓		✓	Unmask synchronous error events	DMSK_FLT		
✓	✓		✓	Read out event status register	READ_ERR		
				Asynchronous error event			
✓	✓		✓	Disable interrupt event	DIS_IRT		
✓	✓		✓	Enable interrupt event	EN_IRT		
✓	✓	✓	✓	Delay execution of higher priority interrupts and asynchronous error events	DIS_AIRT		
✓	✓	✓	✓	Enable execution of higher priority interrupts and asynchronous error events	EN_AIRT		
	✓			Trigger multicomputing interrupt	MP_ALM		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Alarms			
			✓	Generate program alarm with associated values	Program_Alarm		
			✓	Get alarm status	Get_AlarmState		
			✓	Generate user diagnostics alarm that will be entered in the diagnostics buffer.	Gen_UsrMsg		
✓	✓			*Generate alarm message*	*ALARM_S*		
✓	✓			Generate alarm message with acknowledgment	ALARM_SQ		
✓	✓			Create permanently acknowledged PLC alarms D stands for Diagnostics (can be diagnosed) or also for Delete (deletable)	ALARM_D		
✓	✓			Create acknowledgeable PLC alarms D stands for Diagnostics (can be diagnosed) or also for Delete (deletable)	ALARM_DQ		
✓	✓			Determine the acknowledgment status of the last ALARM_SQ incoming alarm S stands for short and C for check	ALARM_SC		
✓	✓			Write a user diagnostics event to the diagnostics buffer Write user message	WR_USMSG		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
	✓			Report up to eight signal changes P stands for process (associated values)	NOTIFY_8P		
	✓			Create PLC alarms without associated values for eight signals	ALARM_8		
	✓			Create PLC alarms with associated values for eight signals P stands for process (associated values)	ALARM_8P		
	✓			Report a signal change	NOTIFY		
	✓			Create PLC alarms with acknowledgment display	ALARM		
	✓			Send archive data	AR_SEND		
				Additional instructions			
✓	✓			Read out dynamically assigned system resources	READ_SI		
✓	✓			Delete dynamically assigned system resources	DEL_SI		
	✓			Enable PLC alarms	EN_MSG		
	✓			Disable PLC alarms	DIS_MSG		
				Diagnostics			
✓	✓		✓	Read current OB start information	RD_SINFO		
			✓	Read out runtime statistics	RT_INFO		
	✓			Determine OB program runtime	OB_RT		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
	✓			Determine current connection status	C_DIAG		
✓	✓			Read system status list	RDSYSST		
		✓	✓	Read LED status	LED		
			✓	Read out name of a module	Get_Name		
			✓	Read out information of an IO device	GetStationInfo		
		✓	✓	Read module status information of an IO system	DeviceStates		
		✓	✓	Read module status information of a module	ModuleStates		
			✓	Generate diagnostics information	GEN_DIAG		
		✓	✓	Read diagnostics information	GET_DIAG		
				Pulse			
		✓		Pulse width modulation	CTRL_PWM		
				Recipes & data logging			
				Recipe functions			
		✓	✓	Export recipe	RecipeExport		
		✓	✓	Import recipe	RecipeImport		
				Data logging			
		✓	✓	Create data log	DataLogCreate		
		✓	✓	Open data log	DataLogOpen		
		✓	✓	Write data log	DataLogWrite		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
			✓	Empty data log	DataLogClear		
		✓	✓	Close data log	DataLogClose		
			✓	Delete data log	DataLogDelete		
		✓	✓	Data log in new file	DataLogNewFile		
				Data block functions			
✓				Create data block	CREAT_DB		
			✓	Create data block	CREATE_DB		
✓				Create data block in the load memory	CREA_DBL		
✓		✓	✓	Read from data block in the load memory	READ_DBL		
✓	✓	✓	✓	Write to data block in the load memory	WRIT_DBL		
			✓	Read data block attributes	ATTR_DB		
✓	✓			Delete data block	DEL_DB		
			✓	Delete data block	DELETE_DB		
✓	✓			Test data block	TEST_DB		
				Table functions			
✓	✓			Add value to table	ATT		
✓	✓			Output first value of the table	FIFO		
✓	✓			Find value in table	TBL_FIND		
✓	✓			Output last value of the table	LIFO		

Basic instructions				Extended instructions	Technology	Communication	
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓			Execute table instruction	TBL		
✓	✓			Copy value from table	TBL_WRD		
✓	✓			Link value logically with table element and save	WRD_TBL		
✓	✓			Calculate standard deviation	DEV		
✓	✓			Correlated data tables	CDT		
✓	✓			Link tables	TBL_TBL		
✓	✓			Collect/distribute table data	PACK		
				Addressing			
		✓	✓	Determine the hardware ID from the slot	GEO2LOG		
		✓	✓	Determine the slot from the hardware ID	LOG2GEO		
		✓	✓	From the addressing of STEP 7 V5.5 SPx, determine the hardware ID	LOG2MOD		
			✓	Determine the hardware ID from an IO address	IO2MOD		
		✓	✓	Determine the IO addresses from the hardware ID	RD_ADDR		
				Additional instructions			
✓	✓		✓	Determine start address of a module S7-1500: only exists to provide compatibility - not recommended	GEO_LOG		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Determine the module slot belonging to a logical address S7-1500: only exists to provide compatibility - not recommended	LOG_GEO		
✓	✓		✓	Determine the IO addresses from the hardware ID	RD_LGADR		
✓	✓		✓	Determine hardware identifier from slot and offset in the user data address area	GADR_LGC		
✓	✓		✓	Determine slot from hardware identifier S7-1500: only exists to provide compatibility - not recommended	LGC_GADR		
				Additional instructions			
				iSlave			
✓				Set network address as own iSlave	SET_ADDR		

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PID cntrol – compact PID	48	S7-300C functions	50	Motion control	51

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Counting (and measuring)			
		✓		Control fast counters	CTRL_HSC		
			✓	Fast counter for counting, measuring and position detection	High_Speed_Counter		
				PID control			
				Compact PID			
		✓	✓	Universal PID controller with integrated optimization for low hydraulic actuators	PID_Compact		
		✓	✓	PID controller with integrated optimization for valves and actuators	PID_3Step		
		✓	✓	Temperature controller with integrated optimization for temperature processes	PID_Temp		

Basic instructions			Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PID basic functions			
✓	✓		✓	Continuous controller	CONT_C		
✓	✓		✓	Step controller for integrating actuators	CONT_S		
✓	✓		✓	Pulse generator for proportional actuators	PULSEGEN		
✓	✓		✓	Continuous temperature controller with pulse generator	TCONT_CP		
✓	✓		✓	Temperature controller for integrating actuators	TCONT_S		
✓	✓			Automatic optimization for a continuous controller	TUN_EC		
✓	✓			Automatic optimization for a step controller	TUN_ES		
				Integrated system functions			
✓	✓			Continuous controller	CONT_C_SF		
✓	✓			Step controller for integrating actuators	CONT_S_SF		
✓	✓			Pulse generator for proportional actuators	PULSGEN_SF		
				Function modules			
✓	✓			Various instructions FM modules counting / positioning / cam control / PID control / temperature control	✔		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				S7-300C functions			
✓				Position with analog output	ANALOG		
✓				Position with digital output	DIGITAL		
✓				Control counter	COUNT		
✓				Control frequency measurement	FREQUENC		
✓				Control pulse width modulation	Pulse		
				Time-controlled inputs/outputs			
			✓	Synchronize TIO module	TIO_SYNC		
			✓	Read in process input signals with time stamp	TIO_IOLink_IN		
			✓	Read in edges on digital input and associated time stamp	TIO_DI		
			✓	Output process output signals time-controlled	TIO_IOLink_OUT		
			✓	Output edges at digital output time-controlled	TIO_DQ		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Motion control			
				S7-1x00 motion control			
		✓	✓	Enable axis	MC_Power		
		✓	✓	Acknowledge error	MC_Reset		
		✓	✓	Reference axis	MC_Home		
		✓	✓	Stop axis	MC_Halt		
		✓	✓	Move axis to absolute position	MC_MoveAbsolute		
		✓	✓	Move axis to relative position	MC_MoveRelative		
		✓	✓	Traverse axis at set velocity	MC_MoveVelocity		
		✓	✓	Traverse axis in jog mode	MC_MoveJog		
		✓		Execute axis jobs as motion sequence	MC_CommandTable		
		✓		Change dynamic settings of the axis	MC_ChangeDynamic		
		✓		Write tag of positioning axis	MC_WriteParam		
		✓		Continuously read dynamic data of a positioning axis	MC_ReadParam		

Instructions in the section "Communication"

Instruction groups	Page	Instruction groups	Page	Instruction groups	Page
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S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PROFINET and PROFIBUS			
✓	✓		✓	Safety only: Fail-safe sending of data via PROFIBUS DP/PROFINET IO	SENDDP		
✓	✓		✓	Safety only: Fail-safe receiving of data via PROFIBUS DP/PROFINET IO	RCVDP		
				S7 communication			
✓	✓	✓	✓	*Read data from a remote CPU*	*GET*		
✓	✓	✓	✓	*Write data to a remote CPU*	*PUT*		
✓	✓		✓	Send data uncoordinated	USEND		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Receive data uncoordinated	URCV		
✓	✓		✓	Send data in segments	BSEND		
✓	✓		✓	Receive data in segments	BRCV		
✓				Query connection status	C_CNTRL		
✓	✓			Safety only: Fail-safe sending of data via S7 connections	SENDS7		
✓	✓			Safety only: Fail-safe receiving of data via S7 connections	RCVS7		
Additional instructions					Note: S stands for short, because only one parameter is possible		
✓	✓			Read data from a remote CPU	GET_S		
✓	✓			Write data to a remote CPU	PUT_S		
✓	✓			Send data uncoordinated	USEND_S		
✓	✓			Receive data uncoordinated	URCV_S		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
Open User Communication							
		✓	✓	Manage the communications connection and send data via Ethernet	TSEND_C		
		✓	✓	Manage the communications connection and receive data via Ethernet	TRCV_C		
		✓	✓	Manage the communications connection and transfer e-mail	TMAIL_C		
Additional instructions							
✓	✓	✓	✓	Establish communications connection	TCON		
✓	✓	✓	✓	Terminate communications connection	TDISCON		
✓	✓	✓	✓	Send data via communications connection	TSEND		
✓	✓	✓	✓	Receive data via communications connection	TRCV		
		✓	✓	Reset connection	T_RESET		
		✓	✓	Check connection	T_DIAG		
		✓	✓	Configure interface	T_CONFIG		
✓	✓			Program-controlled IP and connection configuration via SEND/RECEIVE	IP_CONFIG		
✓	✓	✓	✓	Send data via Ethernet (UDP)	TUSEND		
✓	✓	✓	✓	Receive data via Ethernet (UDP)	TURCV		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓			Change IP configuration parameters	IP_CONF		
✓	✓			Exchange data using FETCH and WRITE via TCP	FW_TCP		
✓	✓			Exchange data using FETCH and WRITE via ISO-on-TCP	FW_IOT		
WEB server							
✓	✓	✓	✓	Synchronize user-defined Web pages	WWW		
Fail-safe HMI Panels							
✓	✓		✓	For Mobile Panel 277 F IWLAN: Communication via PROFISafe with connected device	F_FB_MP		
✓	✓		✓	For Mobile Panel 277 F IWLAN: Managing up to 4 panels in the effective range	F_FB_RNG_4		
✓	✓		✓	For Mobile Panel 277 F IWLAN: Managing up to 16 panels in the effective range	F_FB_RNG_16		
✓	✓		✓	For second-generation mobile panels: Communication via PROFIsafe with connected device	F_FB_KTP_ Mobile		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	For second-generation mobile panels: Managing panels in the effective range	F_FB_KTP_RNG		
				Modbus TCP			
		✓	✓	Communicate as Modbus TCP client via PROFINET	MB_CLIENT		
		✓	✓	Communicate as Modbus TCP server via PROFINET	MB_SERVER		
✓	✓			Establish communication between a CPU with an integrated PN interface and a partner that supports the Modbus/TCP protocol.	MODBUSPN		
✓	✓			Connection management	TCP_COMM		
✓	✓			Communicate as Modbus TCP client via Ethernet	MOD_CLI		
✓	✓			Communicate as Modbus TCP server via Ethernet	MOD_SRV		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Communications processors Not for SIMATIC S7-1500 Software Controller CPU 150xS			
				Point-to-point or PtP communication S7-300/400: Commands for ET200SP CM PtP			
		✓		Configured communications parameters dynamically	PORT_CFG		
✓	✓	✓	✓	Configure PtP communications port S7-300/400: only when using an ET200SP CM PtP	Port_Config		
		✓		Configure serial transmission parameters dynamically	SEND_CFG		
✓	✓	✓	✓	Configure PtP sender	Send_Config		
		✓		Configure serial receive parameters dynamically	RCV_CFG		
✓	✓	✓	✓	Configure PtP recipient	Receive_Config		
✓	✓	✓	✓	Configure protocol	P3964_Config		
				Transfer data of the send buffer	SEND_PTP		
✓	✓	✓	✓	Send data	Send_P2P		
		✓		Enable receipt of messages	RCV_PTP		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Receive data	Receive_P2P		
				Delete receive buffer	RCV_RST		
✓	✓	✓	✓	Delete receive buffer	Receive_Reset		
				Query RS-232 signals	SGN_GET		
✓	✓	✓	✓	Read status	Signal_Get		
				Set RS-232 signals	SGN_SET		
✓	✓	✓	✓	Set accompanying signals	Signal_Set		
✓	✓	✓	✓	Get extended functions	Get_Features		
✓	✓	✓	✓	Set extended functions	Set_Features		
				USS communication S7-300/400: Commands for ET200SP CM PtP			
		✓		Edit communication via USS network	USS_PORT		
✓	✓	✓	✓	Communication by means of a USS network	USS_Port_Scan		
		✓		Prepare and display data for the drive	USS_Drive		
✓	✓	✓	✓	Data exchange with the drive	USS_Drive_Control		
		✓		Read out parameters from the drive	USS_RPM		
✓		✓	✓	Read data from drive	USS_Read_Param		
		✓		Change parameters in the drive	USS_WPM		
✓	✓	✓	✓	Change data in drive	USS_Write_Param		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				MODBUS (RTU) S7-300/400: Commands for ET200SP CM PtP			
		✓		Configure port on the PtP module for Modbus RTU	MB_COMM_LOAD		
✓	✓	✓	✓	Configure communications module for Modbus	Modbus_Comm_Load		
		✓		Communicate as Modbus master via PtP port	MB_MASTER		
✓	✓	✓	✓	Communicate as Modbus master	Modbus_Master		
		✓		Communicate as Modbus slave via PtP port	MB_SLAVE		
✓	✓	✓	✓	Communicate as Modbus slave	Modbus_Slave		
				PtP link: CP 340			
✓	✓			Receive data	P_RCV		
✓	✓			Send data	P_SEND		
✓	✓			Output message text with up to 4 tags on printer	P_PRINT		
✓	✓			Delete receive buffer	P_REST		
✓	✓			Read accompanying signals on the RS-232C interface	V24_STAT_340		
✓	✓			Read accompanying signals on the RS-232C interface	V24_SET_340		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PtP link: CP 341			
✓	✓			Receive data or make data available	P_RCV_RK		
✓	✓			Send or fetch data	P_SND_RK		
✓	✓			Output message text with up to 4 tags on printer	P_PRT341		
✓	✓			Read accompanying signals on the RS-232C interface	V24_STAT		
✓	✓			Write accompanying signals on the RS-232C interface	V24_SET		
				PtP link: CP 440			
✓	✓			Receive data	RECV_440		
✓	✓			Send data	SEND_440		
✓	✓			Delete receive buffer	RES_RECV		
				PtP link: CP 441			
✓	✓			Read accompanying signals on the RS-232C interface	V24_STAT_441		
✓	✓			Write accompanying signals on the RS-232C interface	V24_SET_441		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				MODBUS slave (RTU)			
✓	✓			Modbus slave instruction for CP 341	MODB_341		
✓	✓			Modbus slave instruction for CP 441	MODB_441		
				MODBUS: CP 443			
✓	✓			Establish communication between a CP and a partner that supports the OPEN MODBUS/TCP protocol	MODBUSCP		
✓	✓			Communicate as Modbus client	MB_CPCLI		
✓	✓			Communicate as Modbus server	MB_CPSRV		
				ET 200S serial interface	Note: S stands for serial		
✓	✓		✓	Receive data	S_RCV		
✓	✓		✓	Send data	S_SEND		
✓	✓		✓	Read accompanying signals on the RS-232C interface	S_VSTAT		
✓	✓		✓	Write accompanying signals on the RS-232C interface	S_VSET		
✓	✓		✓	Set data flow control using XON/XOFF	S_XON		
✓	✓		✓	Set data flow control using RTS/CTS	S_RTS		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Set data flow control using auto. control of the RS-232C accompanying signals	S_V24		
✓	✓		✓	Modbus slave instruction for ET 200S 1SI	S_MODB		
✓	✓		✓	Send data to a USS slave	S_USST		
✓	✓		✓	Receive data from a USS slave	S_USSR		
✓	✓		✓	Initialize USS	S_USSI		
				SIMATIC NET CP			
				Open User Communication			
✓	✓			Transfers data to the CP for transmission via a configured connection	AG_SEND		
✓	✓			Transfers jobs to the CP to accept received data	AG_RECV		
✓	✓			Blocks the data exchange via a connection using FETCH/WRITE	AG_LOCK		
✓	✓			Diagnostics of connections	AG_UNLOCK		
✓	✓			Diagnostics of connections	AG_CNTRL		
✓	✓			Connection diagnostics, connection establishment, ping request	AG_CNTEX		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PROFIBUS DP			
✓	✓			Data transfer to the CP as DP master or DP slave	DP_SEND		
✓	✓			Receipt of data from the CP as DP master or DP slave	DP_RECV		
✓	✓			Request for diagnostics information	DP_DIAG		
✓	✓			Transfer of control information to the PROFIBUS CP	DP_CTRL		
				PROFINET IO			
✓	✓			Data transfer to the CP as IO controller or IO device	PNIO_SEND		
✓	✓			Receipt of data from the CP as IO controller or IO device	PNIO_RECV		
✓	✓			Read data record or write data record in the IO controller	PNIO_RW_REC		
✓	✓			Alarm evaluation by the CP 343-1 as IO controller	PNIO_ALARM		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				PROFIenergy			
✓	✓			Start or end the energy-saving pause	PE_START_END_CP		
✓	✓			Extended starting or ending of the energy-saving pause	PE_CMD_CP		
✓	✓			Handling of the commands of the IO controller in the PROFIenergy device	PE_I_DEV_CP		
✓	✓			Transfer of the switch setting of power modules to ET 200S	PE_DS3_Write_ET200_CP		
				Additional instructions			
✓	✓			Use of a logical trigger for ERPC communication	LOGICAL_TRIGGER		
✓	✓			Setup of FTP connections from and to an FTP server	FTP_CMD		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				GPRSComm:CP 1242-7			
		✓		Establish connection via the GSM network	TC_CON		
		✓		Terminate connection via the GSM network	TC_DISCON		
		✓		Send data via the GSM network	TC_SEND		
		✓		Receive data via the GSM network	TC_RECV		
		✓		Transfer configuration data to CP	TC_CONFIG		
				S7-300C functions			
				ASCII, 3964®			
✓				Send data (ASCII, 3964®)	SEND_PTP_300C		
✓				Receive data (ASCII, 3964®)	RCV_PTP_300C		
✓				Reset input buffer (ASCII, 3964®)	RES_RCVB_300C		
				RK 512			
✓				Send data (RK 512)	SEND_RK_300C		
✓				Fetch data (RK 512)	FETCH_RK_300C		
✓				Receive data and make available (RK 512)	SERVE_RK_300C		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Communication with iSlave			
✓	✓			Read data of a communications partner within own S7 station	I_GET		
✓	✓			Write data of a communications partner within own S7 station	I_PUT		
✓	✓			Abort connection to the communications partner within own S7 station	I_ABORT		
				PROFINET CBA			
✓	✓			Update inputs of the user program interface	PN_IN		
✓	✓			Update outputs of the user program interface	PN_OUT		
✓	✓			Break DP interconnections	PN_DP		
				MPI communication	Note: X stands for the MPI interface		
✓	✓			Send data to communications partner outside own S7 station	X_SEND		
✓	✓			Receive data from communications partner outside own S7 station	X_RCV		
✓	✓			Read data from communications partner outside own S7 station	X_GET		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓			Write data to communications partner outside own S7 station	X_PUT		
✓	✓			Abort existing connection to the communications partner outside own S7 station	X_ABORT		
				TeleService			
		✓		Transfer e-mail	TM_Mail		
✓	✓			Establish remote connection to PG/PC	PG_DIAL		
✓	✓			Establish remote connection to AS	AS_DIAL		
✓	✓			Send SMS message	SMS_SEND		
✓	✓			Transfer e-mail	AS_MAIL		

Appendix: optional instructions

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				SIMATIC Ident			
✓	✓	✓	✓	Read data from transponder	Read		
✓	✓	✓	✓	Read out data from code reading system	Read_MV		
✓	✓	✓	✓	Reset reader	Reset_Reader		
✓	✓	✓	✓	Set program on the code reading system	Set_MV_Program		
✓	✓	✓	✓	Write data to the transponder	Write		
				Status queries			
✓	✓	✓	✓	Read out status of the reader	Reader_Status		
✓	✓	✓	✓	Read out status of the transponder	Tag_Status		
				Extended functions			
✓	✓	✓	✓	Download configuration data to the reader	Config_Download		
✓	✓	✓	✓	Back up configuration data of the reader	Config_Upload		
✓	✓	✓	✓	Detect transponder population	Inventory		
✓	✓	✓	✓	Read out EPC memory data of a transponder	Read_EPC_Mem		
✓	✓	✓	✓	Read out TID memory data of a transponder	Read_TID		
✓	✓	✓	✓	Read out UID of a HF transponder	Read_UID		
✓	✓	✓	✓	Switch on/off antennas of RF300 readers	Set_ANT_RF300		

Basic instructions				Extended instructions	Technology		Communication
S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓	✓	✓	Switch on/off antennas of RF620R/RF630R	Set_ANT_RF600		
✓	✓	✓	✓	Set UHF parameters in the reader	Set_Param		
✓	✓	✓	✓	Write EPC ID of a UHF transponder	Write_EPC_ID		
✓	✓	✓	✓	Write to EPC memory of a UHF transponder	Write_EPC_Mem		
✓	✓	✓	✓	Ident function for trained users with command transfer to a data structure	Advanced_CMD		
✓	✓	✓	✓	Sophisticated Ident function for experts with all commands and options	Ident_Profile		
Additional reset functions							
✓	✓	✓	✓	Reset MOBY D reader	Reset_MOBY_D		
✓	✓	✓	✓	Reset MOBY U reader	Reset_MOBY_U		
✓	✓	✓	✓	Reset MV code reader	Reset_MV		
✓	✓	✓	✓	Reset RF200 reader	Reset_RF200		
✓	✓	✓	✓	Reset RF300 reader	Reset_RF300		
✓	✓	✓	✓	Reset RF600 reader	Reset_RF600		
✓	✓	✓	✓	Reset function for experts allows universally adjustable parameters	Reset_Un		

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