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SIMATIC

S7-1200 / S7-1500

Comparison list for programming languages based on the international mnemonics

Reference manual

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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.

Trademarks

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Disclaimer of liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Overview of the comparison list

Below you will find an overview of which instructions and functions you can use for which controller family. To retain clarity, we have structured the comparison list as follows:

- Basic instructions

  Instructions that you use often, such as bit logic operations, timers, counters, math functions
- Extended instructions

  More intricate instructions for further options, for example date and time, interrupts, alarms, PROFIenergy
- Technological instructions (Technology)

  Technological functions such as PID control, motion
- Instructions for communication (Communication)

  Instructions for communication such as S7 communication, Open User Communication

Validity and constraints

- SIMATIC STEP 7 as of Version 12, service pack 1
- SIMATIC S7-1200 as of firmware 3.x; SIMATIC S7-1200 supports only LAD, FBD and SCL.
- STL: Some instructions need to be called up with CALL

Legend

✔	usable
(✔)	usable with restrictions
nn	not necessary
grayed out	We recommend that you do not use the grayed out commands in the S7-1200 or S7-1500. The reason for this is that these commands are not suitable for symbolic addressing or multi-instances. SIMATIC counters and timers are not advisable because they are not capable of multi-instances.
xyz	New instruction as of V13
	For this the SIMATIC S7-1200 requires at least firmware 4.0 and SIMATIC S7-1500 at least firmware 1.5

Measuring the runtime of instructions and program sections
The time required to execute parts of the user program and instructions depends on many factors. As result, a list of these in a table is unfortunately not possible.

With the RUNTIME instruction (measurement of execution time), you measure the runtime of the entire program, individual blocks or command sequences.

The runtime measurement begins when the RUNTIME instruction is called the first time and ends with the second call.

Example of a program in SCL:
```
"Common_Data".opt.Last_Cycle := RUNTIME(#Tag_Memory); //Start of the runtime measurement,
        Lreal "speed test FB opt_DB"(ON_2:="i1",…);//Runtime measurement using RUNTIME
"Common_Data".opt.Last_Cycle := RUNTIME(#Tag_Memory); //End of the runtime measurement
```

For runtime measurement of individual instructions, use an OB priority >15. This ensures that "online monitoring" does not falsify the runtime.

You will find further information in the online help of SIMATIC STEP 7. Enter RUNTIME as the search term.

Basic instructions	Extended instructions	Technology	Communication

Instructions in the section "Basic instructions"

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 S7-1200 LAD and FBD only	R_TRIG			
		(✔)	✔	Set tag on negative signal edge S7-1200 LAD and FBD only	F_TRIG			
✔	✔	✔	✔	Normally open contact	-||-	nn	nn	nn
✔	✔	✔	✔	Normally closed contact	-|/|-	nn	nn	nn
				Timers				
				IEC timers				
✔	✔	✔	✔	Generate pulse	TP			
✔	✔	✔	✔	Generate on-delay	TON			
✔	✔	✔	✔	Generate off-delay	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
				SIMATIC timers				
✔	✔		✔	Assign pulse timer parameters and start	S_PULSE		nn	S_PULSE

Basic instructions				Extended instructions	Technology	Communication	

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
✔	✔		✔	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

							STL	
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	
✔	✓	✔	✓	Count down			CTD	
✔	✓	✔	✓	Count up and down			CTUD	
				SIMATIC counters				
✔	✓		✓	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|-		
				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		

					LAD / FBD	STL (not S7-1200)	SCL
S7-300	**S7-400**	**S7-1200**	**S7-1500**	**Description**			
✔	✓	✓	✓	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	
✔	✓	✓	✓	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	**	**
				VARIANT instructions			
				Comparator operations			
			✓	Check data type of a VARIANT tag		TypeOf	TypeOf
			✓	Check element data type of a VARIANT tag		TypeOfElements	TypeOfElements

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
			✓	Compare data type for EQUAL with a specific data type	EQ_Type		nn
			✓	Compare data type for UNEQUAL with the data type of a tag	NE_Type		nn
			✓	Compare element data type for EQUAL with the data type of a tag	EQ_ElemType		nn
			✓	Compare element data type for UNEQUAL with the data type of a tag	NE_ElemType		nn
			✓	Compare for EQUALS ZERO	IS_NULL		nn
			✓	Compare for UNEQUALS ZERO	NOT_NULL		nn
			✓	Check for ARRAY	IS_ARRAY		
				Move operations			
			✓	Read out VARIANT tag value	VariantGet		
			✓	Write VARIANT tag value	VariantPut		
			✓	Get number of ARRAY elements	CountOfElements		
			✓	Move block	MOVE_BLK_VARIANT		
				Conversion operations			
			✓	Convert VARIANT to DB_ANY		VARIANT_TO_DB_ANY	
			✓	Convert DB_ANY to VARIANT		DB_ANY_TO_VARIANT	

Tabs: Basic instructions | Extended instructions | Technology | Communication

Basic instructions				Extended instructions	Technology	Communication	

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Array-DB instructions			
			✓	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	
				Move operations			
(✓)	(✓)	✓	✓	Move value S7-300/400: LAD and FBD only	MOVE		:=
			✓	Move data type from ARRAY of BYTE (Deserialize)		Deserialize	
			✓	Move data type to ARRAY of BYTE (Serialize)		Serialize	
		✓	✓	Read field Recommendation: indexed access to an array	FieldRead		
		✓	✓	Write field Recommendation: indexed access to an array	FieldWrite		
		✓	✓	Move block		MOVE_BLK	
		✓	✓	Move block uninterruptible		UMOVE_BLK	
		✓	✓	Fill block		FILL_BLK	
		✓	✓	Fill block uninterruptible		UFILL_BLK	

| Basic instructions | | | | Extended instructions | Technology | Communication |

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
		✔	✔	Swap		SWAP	
				Read/write access Recommendation: program symbolically			
			✔	Read data in little-endian format			ReadLittle
			✔	Write data in little-endian format			WriteLittle
			✔	Read data in big-endian format			ReadBig
			✔	Write data in big-endian format			WriteBig
		✔	✔	Read memory address			PEEK
		✔	✔	Read memory bit			PEEK_BOOL
		✔	✔	Write memory address			POKE
		✔	✔	Write memory bit			POKE_BOOL
		✔	✔	Write memory area			POKE_BLK

S7-300	S7-400	S7-1200	S7-1500	Basic instructions	Extended instructions	Technology	Communication
				Description	LAD / FBD	STL (not S7-1200)	SCL
				Additional instructions Recommendation: program symbolically			
✓	✓		✓	Move block		BLKMOV	
✓	✓		✓	Move block uninterruptible		UBLKMOV	
✓	✓		✓	Fill block		FILL	
				Conversion operations			
✓	✓	✓	✓	Convert value S7-1200/1500: is performed implicitly, so usually unnecessary.	CONV	CONVERT	
✓	✓	✓	✓	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 S7-1200: FBD, LAD and SCL only		SCALE_X	
		✓	✓	Normalize S7-1200: FBD, LAD and SCL only		NORM_X	

Basic instructions				Extended instructions	Technology	Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✔		✔	Convert a integer to a floating-point number that will be scaled in physical units between a low and a high limit value (scaling).	SCALE		
✔	✔		✔	Unscale a floating-point number in physical units between a low and a high limit value and convert to an integer (unscale).	UNSCALE		
✔	✔		✔	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
✔	✔		✔	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
✔	✔		✔	Create ones complement integer (16 bit) S7-1500: The conversion is also performed implicitly	nn	INVI	nn

| Basic instructions | | | | Extended instructions | Technology | Communication |

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✓		✓	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
✔	✓		✓	Switch bytes in the right word of accumulator 1	nn	CAW	nn
✔	✓		✓	Switch all bytes in accumulator 1	nn	CAD	nn
				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…

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✓	✓	✓	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		//	//, (*…*)
				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
✔	✓		✓	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

Basic instructions				Extended instructions	Technology	Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✔		✔	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
✔	✔		✔	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 LAD / FBD: only with S7-300/400	OPN	OPN DBx	nn
✔	✔		✔	Open data block in DI register LAD / FBD: only with S7-300/400	OPNi	OPN DIx	nn
✔	✔		✔	Swap data block register		CDB	nn
✔	✔		✔	Load the length of a global data block into accumulator 1		L DBLG	nn

Basic instructions				Extended instructions	Technology	Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✔		✔	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
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	
		✔	✔	Initialize all retain data		INIT_RD	
✔	✔	✔	✔	Configure time delay		WAIT	

Basic instructions				Extended instructions	Technology	Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓			Change protection level		PROTECT	
		✓	✓	Measure program runtime LAD and FBD: new		RUNTIME	
				Word logic operations			
✓	✓	✓	✓	Create ones complement	INV		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

				Description	LAD / FBD	STL (not S7-1200)	SCL
Basic instructions					**Extended instructions**	**Technology**	**Communication**
S7-300	S7-400	S7-1200	S7-1500				
				Shift and rotate instructions			
✓	✓	✓	✓	Rotate right		ROR	
✓	✓	✓	✓	Rotate left		ROL	
✓	✓	(✓)	✓	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

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✔	✔		✔	Load AR2 with contents of accumulator 1		LAR2	nn
✔	✔		✔	Load AR2 with double word or area pointer		LAR2 <D>	nn
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 AR2 to accumulator 1		TAR2	nn
✔	✔		✔	Transfer AR2 to double word		TAR2 <D>	nn
Additional instructions							
✔	✔		✔	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	

Basic instructions				Extended instructions		Technology		Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD		STL (not S7-1200)	SCL
✓	✓		✓	Create tens complement	BCDCPL			
✓	✓		✓	Count number of set bits	BITSUM			
✓	✓	✓		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

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
✓	✓		✓	Add accumulator 1 to AR1	nn	+AR1	nn
✓	✓		✓	Add accumulator 1 to AR2	nn	+AR2	nn
✓	✓		✓	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"

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**

B1	B2	B3	B4	Description	Instruction
				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
✓	✓			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 + char	
			✓	Convert several strings organized as an array or PLC data type into one char array with separators	JOIN
			✓	Convert a char array into several strings organized as an array or PLC data type	SPLIT
		✓	✓	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
✓	✓	✓	✓	Convert ASCII string to hexadecimal number (conversion 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		
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
	✓		✓	Read out name of a tag in the input parameter	GetSymbolName
	✓		✓	Read out name of the block instance	GetInstanceName
	✓		✓	Read out name of the block	GetBlockName
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

Basic instructions	Extended instructions	Technology	Communication

				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
				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
				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

Basic instructions			Extended instructions	Technology / Communication
✓		✓	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
✓		✓	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

				Description	Instruction
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
✓	✓	✓	✓	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

Basic instructions				Extended instructions	Technology	Communication
✔	✔	✔	✔	Enable execution of higher priority interrupts and asynchronous error events	EN_AIRT	
	✔			Trigger multicomputing interrupt	MP_ALM	
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 S stands for short, this function was replaced by D	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	

Basic instructions		Extended instructions	Technology	Communication
✔	✔	Write a user diagnostics event to the diagnostics buffer Write user message	WR_USMSG	
	✔	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	

Basic instructions	Extended instructions	Technology	Communication

Diagnostics				
✔	✔		✔	Read current OB start information	RD_SINFO
			✔	Read out runtime statistics	RT_INFO
	✔			Determine OB program runtime	OB_RT
	✔			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
			✔	Read identification data and maintenance data	Get_IM_Data
Pulse				
		✔		Pulse width modulation	CTRL_PWM
Recipes & data logging				
Recipe functions				
		✔	✔	Export recipe	RecipeExport
		✔	✔	Import recipe	RecipeImport

				Basic instructions	Extended instructions	Technology	Communication

				Description	Instruction
				Data logging	
	✓		✓	Create data log	DataLogCreate
	✓		✓	Open data log	DataLogOpen
	✓		✓	Write data log	DataLogWrite
			✓	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
✓	✓			Execute table instruction	TBL

Basic instructions		Extended instructions	Technology	Communication
✓ ✓		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

Basic instructions			Extended instructions	Technology	Communication
			Additional instructions		
✓	✓	✓	Determine start address of a module	GEO_LOG	
✓	✓	✓	Determine the module slot belonging to a logical address	LOG_GEO	
✓	✓	✓	Determine the IO addresses from the hardware ID	RD_LGADR	
✓	✓	✓	Determine logical start address of a module	GADR_LGC	
✓	✓	✓	Determine the slot belonging to a logical address S7-1500: only exists to provide compatibility - not recommended	LGC_GADR	
			Additional instructions		
			iSlave		
✓			Set network address as own iSlave	SET_ADDR	

Instructions in the section "Technology"

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		PID_Compact	
✓		✓		PID controller with integrated optimization for valves		PID_3Step	

				Description	LAD / FBD	STL (not S7-1200)	SCL
Basic instructions				Extended instructions		Technology	Communication
S7-300	S7-400	S7-1200	S7-1500				
				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	

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				Function modules			
✓	✓			Various instructions FM modules counting / positioning / cam control / PID control / temperature control		✓	
				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	
				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	

Basic instructions	Extended instructions	Technology	Communication

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
		✓	✓	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	

Instructions in the section "Communication"

S7-300	S7-400	S7-1200	S7-1500	Description	LAD / FBD	STL (not S7-1200)	SCL
				S7 communication			
✓	✓	✓	✓	Read data from a remote CPU		GET	
✓	✓	✓	✓	Write data to a remote CPU		PUT	
✓	✓		✓	Send data uncoordinated		USEND	
✓	✓		✓	Receive data uncoordinated		URCV	
✓	✓		✓	Send data in segments		BSEND	
✓	✓		✓	Receive data in segments		BRCV	
✓				Query connection status		C_CNTRL	

Basic instructions		Extended instructions		Technology		Communication

				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
				Open User Communication Note the differences between the S7-1200 and S7-1500, refer to the manual	
		✓	✓	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
✓	✓	✓	✓	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
✓	✓			Configure interface	IP_CONFIG

				Basic instructions	Extended instructions	Technology	Communication

				Additional instructions	
✓	✓	✓	✓	Send data via Ethernet (UDP)	TUSEND
✓	✓	✓	✓	Receive data via Ethernet (UDP)	TURCV
✓	✓			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
				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

Communications processors					
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	
✓	✓	✓	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	

Basic instructions			Extended instructions	Technology	Communication
✓	✓	✓	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
			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

Basic instructions	Extended instructions	Technology	Communication

		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
		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

Basic instructions	Extended instructions	Technology	**Communication**

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

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

Basic instructions			Extended instructions	Technology	Communication
✓	✓	✓	Set data flow control using RTS/CTS		S_RTS
✓	✓	✓	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
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

Basic instructions		Extended instructions	Technology	Communication
✓ ✓	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
	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

Basic instructions	Extended instructions	Technology	Communication

		Additional instructions		
✓	✓	Use of a logical trigger for ERPC communication		LOGICAL_TRIGGER
✓	✓	Setup of FTP connections from and to an FTP server		FTP_CMD
		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

		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
✓	✓	Write data to communications partner outside own S7 station	X_PUT
✓	✓	Abort existing connection to the communications partner outside own S7 station	X_ABORT

Basic instructions	Extended instructions	Technology	Communication
			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