

Communication Manual)

Total Station (GT, DS-200i)

Measuring Station

Edition

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1. INTRODUCTION

- Thank you for purchasing a TOPCON product.
- The specifications are subject to change without prior notice and without obligation by TOPCON CORPORATION, and may differ from those appearing in this manual.
- The content of this manual is subject to change without notice.
- This manual is protected by copyright and all rights are reserved by TOPCON CORPORATION.
- TOPCON CORPORATION. will not be liable to you for any profit or loss resulting from the use
 of these commands.
- Except as permitted by Copyright law, this manual may not be copied, and no part of this manual may be reproduced in any form or by any means.
- This manual may not be modified, adapted or otherwise used for the production of derivative works.

Symbols

The following conventions are used in this manual.

Note: Indicates supplementary explanation.

IF: Indicates the chapter title to refer to for additional information.

Precautions

 Data should be backed up (transferred to an external device etc.) on a regular basis to prevent data loss.

Exceptions from liability

- The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
- The manufacturer, or its representatives, assumes no responsibility for results of faulty or intentional usage or misuse including any direct, indirect, consequential damage, or loss of profits.
- The manufacturer, or its representatives, assumes no responsibility for consequential damage, or loss of profits due to any natural disaster, (earthquake, storms, floods etc.), fire, accident, or an act of a third party and/or usage under unusual conditions.
- The manufacturer, or its representatives, assumes no responsibility for any damage (change of data, loss of data, loss of profits, an interruption of business etc.) caused by use of the product or an unusable product.
- The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits caused by usage different to that explained in the operator's manual.
- The manufacturer, or its representatives, assumes no responsibility for damage caused by incorrect operation, or action resulting from connecting to other products.



2. INSTRUMENTS COVERED

This manual explains the command operations between the following TOPCON instruments and a host computer.

<Total Stations>

- GT (GT-1001/1002/1003/1005/501/502/503/505)
- DS-200i (DS-201i/202i/203i/205i)

<MS>

- MS05AX/MS1AX
- MS05AX II /MS1AX II
- MS1005



3. CONVENTIONS USED IN THIS MANUAL

- Hexadecimal code: Two digits followed by the capital letter "H" represent a single byte (e.g. 12H)
- Commas used as separators are omitted from field descriptions for the sake of convenience.
- This manual only explains categories and options for which a number has been attributed.

E.g. Reflector type

"0: Prism", "1: Sheet", "2: Reflectorless", "3: 360° Prism", "4: SMR"

In the above example the number 5 has not been attributed and is therefore not explained. However, there is a possibility that a new reflector type will be added in the future. The term "Reserved" is used to indicate categories and options that may be used in future.

- For calculations, such as atmospheric correction factor, see the operator's manual for your instrument.
- Entered values are displayed in the display units selected on the instrument. On those instruments for which "inch" can be selected, distance value must be input in "feet".
- The number of digits after the decimal point for distance and coordinate values differ depending on the distance resolution set. Explanations in this manual use 3 digits.

Instrument type	Fine single/repeat	Rapid single/repeat	Tracking
DS-200i	Distance resolution as set on	Low	0.01 m
	instrument		
GT	Distance resolution as set on	Distance resolution as set on	0.01 m/0.001 m
	instrument	instrument	
MS05AX/MS1AX	Distance resolution as set on	Distance resolution as set on	1 decimal place less than
MS05AX II /MS1AX II	instrument	instrument	distance resolution set on
			instrument

Distance

Instrument type	High resolution (range)	Low resolution (range)
GT-1001/1002/1003/	0.0001 m	0.001 m
1005/501/502/503/505	(-99999.9999 to 99999.9999 (m))/	(-99999.999 to 99999.999 (m))/
DS-201i/202i/203i/205i	0.001 ft (-328083.989 to	0.005 ft (-328083.98 to 328083.98 (ft),
	328083.989 (ft), -328083.333 to 328083.333	-328083.33 to 328083.33 (US ft))
	(US ft))	
MS05AX/MS05AX II	0.00001 m (-99999.99999 to	0.0001 m
MS1005	99999.99999(m))/0.000 1 ft (-328083.9895 to	(-99999.9999 to 99999.9999 (m))/
	328083.9895(ft), -328083.3333 to 328083.3333	0.001 ft (-328083.989 to 328083.989(ft),
	(US ft))	-328083.333 to 328083.333 (US ft))
MS1AX	0.0001 m	0.001m
	(-99999.9999 to 99999.9999 (m))/	(-99999.999 to 99999.999 (m))/
	0.001ft (-328083.989 to 328083.989 (ft),	0.01 ft (-328083.98 to 328083.98 (ft),
	-328083.333 to 328083.333 (US ft))	-328083.33 to 328083.33 (US ft))
MS1AX II	0.0001 m	0.001 m
	(-99999.9999 to 99999.9999 (m))/	(-99999.999 to 99999.999 (m))/
	0.001 ft (-328083.989 to 328083.989 (ft),	0.005 ft (-328083.98 to 328083.98 (ft),
	-328083.333 to 328083.333 (US ft))	-328083.33 to 328083.33 (US ft))



N.B. When distance units are set to feet, a selection can be made via key operation on the instrument between International and US feet. (1m = 10000/3048 International feet, = 3937/1200 US feet)

Coordinates

Instrument type	High resolution (range)	Low resolution (range)
GT-1001/1002/1003/	0.0001 m	0.001 m
1005/501/502/503/505	(-9999999.9999~99999999999999)/	(-999999999999999999999999)/
DS-201i/202i/203i/205i	0.001 ft (-328083989.501 to 328083989.501 (ft),	0.005 ft (-328083989.500 to 328083989.500 (ft),
	-328083333.333 to 328083333.333 (US ft))	-328083333.330 to 328083333.330 (US ft))
MS05AX	0.00001 m (-9999999.99999 to 9999999.99999	0.0001 m (-9999999.9999 to 9999999.9999
	(m))/0.0001 ft (-32808398.9501 to	(m))/
	32808398.9501 (ft), -32808333.3333 to	0.001 ft (-32808398.950 to 32808398.950 (ft),
	32808333.3333 (US ft))	-32808333.333 to 32808333.333 (US ft))
MS05AX II	0.00001m	0.0001 m
MS1005	(-9999999.99999~99999999999999999)/	(-9999999.9999~99999999999999)/
	0.0001ft (-328083989.5013 to 328083989.5013	0.001 ft (-328083989.501 to 328083989.501 (ft),
	(ft), -328083333.3333 to 328083333.3333 (US	-328083333.333 to 328083333.333 (US ft))
	ft))	
MS1AX	0.0001 m	0.001 m
	(-999999.9999 to 9999999.9999 (m))/	(-999999.999 to 9999999.999 (m))/
0.001ft (-32808398.950 to 32808398.950		0.01ft (-32808398.95 to 32808398.95 (ft),
	-32808333.333 to 32808333.333 (US ft))	-32808333.33 to 32808333.33 (US ft))
MS1AX II	0.0001 m	0.001 m
	(-9999999.9999~999999999999999)/	(-9999999999999999999999999)/
	0.001 ft (-328083989.501 to 328083989.501 (ft),	0.005 ft (-328083989.500 to 328083989.500
	-328083333.333 to 328083333.333 (US ft))	(ft), -328083333.330 to 328083333.330 (US ft))

Angle

Instrument type	High resolution (range)	Low resolution (range)
GT-1001/1002/501/502	0.5" (0.00000 to 359.59595)/	1"* (0.0000 to 359.5959)/
DS-201i/202i	0.0001 gon (0.0000 to 399.9999)/	0.0002 gon (0.0000 to 399.9998)/
	0.002 mil (0.000 to 6399.998)	0.005 mil (0.000 to 6399.995)
GT-1003/1005/503/505	1"* (0.0000 to 359.5959)/	5" (0.0000 to 359.5955)/
DS-203i/205i	0.0002 gon (0.0000 to 399.9998)/	0.001 gon (0.000 to 399.999)/
	0.005 mil (0.000 to 6399.995)	0.02 mil (0.00 to 6399.98)
MS05AX/MS1AX	0.1"* (0.00000 to 359.59599)/	0.5" (0.00000 to 359.59595)/
MS05AX II /MS1AX II 0.00002 gon (0.00000 to 399.99998)/		0.0001 gon (0.0000 to 399.9999)/
MS1005	0.0005 mil (0.0000 to 6399.9995)	0.002 mil (0.000 to 6399.998)

N.B.

- 1. Angle resolution setting (high/low) is switched using the /B command.
- 2. Angle units can be switched between DDMMSS/gon/mil using the /B command.
- 3. Ranges for all instruments in both high and low resolution can be summed up as follows.
 - $0 \le Angle < 360 (DDMMSS),$
 - $0 \le Angle < 400 (gon),$
 - $0 \le Angle < 6400 (mil)$



4. CONNECTING TO THE HOST COMPUTER

4.1 Connector pin assignments

Pin No.	Signal name
1	SG (GND)
2	NC
3	S (TXD)
4	R (RXD)
5	NC
6	NC

4.2 Interface cables

• These cables connect the surveying instrument and the host computer for data output.

Cable	Notes
DOC129*1	D-sub connector: 9 pins (female)
DOC210*2	D-sub connector: 9 pins (female)

^{*1:} For MS05AX/MS1AX

Note: Pin numbers and signal levels for DOC26, DOC27, DOC129 and DOC210 are RS-232C compatible.



^{*2:} For GT, DS-200i, MS05AX ${\rm I\hspace{-.1em}I}$ /MS1AX ${\rm I\hspace{-.1em}I}$, MS1005

5. STANDARD COMMANDS

Field format

Angle and distance fields (horizontal angle, vertical angle, slope distance) are output as 7 digits with no decimal point. When the number of digits is insufficient, a digit is added as shown below.

• Field format (13H.14H)

Angle and distance fields (horizontal angle, vertical angle, slope distance) are output as 8 digits with no decimal point. When the number of digits is insufficient, a digit is added as shown below.

Angle field 012 34 565
$$\rightarrow$$
 12°34'56.5"

Deg. Min. Sec.

012 34560 \rightarrow 12.34560 gon

position of decimal point

012 34560 \rightarrow 12.34560 mil

position of decimal point

Distance field 0123 4567 \rightarrow 123.4567 m

position of decimal point

0123 4567 \rightarrow 123.4567 ft (US ft)

position of decimal point

Checksum data

To calculate the checksum, add every 8-bit of data from the start of the data to the space (20H) before the checksum. The checksum is the last two significant digits of the total represented as 2 bytes of ASCII code.

Checksum output example: 1234567 1234567 1234567 A4 <cr><lf>Calculation example: 31+32+33+34+35+36+37+......+20=4A4HFor a checksum A4 output, 41H, 34H in ASCII code is output.



5.1. 00H 13H - Angle data request

Send record 00H, 13H

Send field

No	Category	Example	Notes	Omit
1	Data identifying	00H 13H		
	code			

Receive record

0000000 0895942 1243159 <cr><lf> (00H)0000000 0895942 1243159 sum<cr><lf> (00H)00000000 08959425 12345455 <cr><lf> (13H)00000000 08959425 12345455 sum<cr><lf> (13H)

Field

No	Category	Example	Notes	Omit
1	Slope distance	0000000	🕼 "5. STANDARD COMMANDS"	
		00000000	🕼 "5. STANDARD COMMANDS"	
2	Space	1 byte		
3	Vertical angle	0895942	🕼 "5. STANDARD COMMANDS"	
			Range (00H): (dms) 0000000 to 3595959	
			(gon) 0000000 to 3999998	
			(mil) 0000000 to 6399995	
		08959425	🕼 "5. STANDARD COMMANDS"	
			Range (13H): (dms) 00000000 to 35959599	
			(gon) 00000000 to 39999998	
			(mil) 00000000 to 63999995	
4	Space	1 byte		
5	Horizontal angle	1243159	🕼 "5. STANDARD COMMANDS"	
			Range (00H): (dms) 0000000 to 3595959	
			(gon) 0000000 to 3999998	
			(mil) 0000000 to 6399995	
		12345455	🕼 "5. STANDARD COMMANDS"	
			Range (13H): (dms) 00000000 to 35959599	
			(gon) 00000000 to 39999998	
			(mil) 00000000 to 63999995	
6	Space	1 byte		

Error

Time for command reception is 2 sec.

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

0000000 E115 E114 <cr><lf>



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Instruments

<00H>

GT

DS-200i

<00H> <13H> MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Angle data can also be obtained using Ee and *ST1. See explanation for relevant command.



5.2 11H 14H - Slope distance and angle data request

Send record

11H, 14H

Send field

No	Category	Example	Notes	Omit
1	Data identifying	11H 14H		
	code			1

Receive record

0456789 0895942 1243159 <cr><lf> (11H)0456789 0895942 1243159 sum<cr><lf> (11H)12345678 08959425 12345455 <cr><lf> (14H)12345678 08959425 12345455 sum<cr><lf> (14H)

Field

Slope distance	No	Category	Example	Notes	Omit
(#) 0000000 to 3280839 (US ft) 0000000 to 3280833 GT, DS-200i, MS05AX II /MS1AX II , MS1005 Range (11H): (ft) 0000000 to 3280839 (US ft) 00000000 to 32808398 (US ft) 00000000 to 32808398 (US ft) 00000000 to 32808398 (US ft) 00000000 to 32808333 2 Space 1 byte 3 Vertical angle 0895942	1	Slope distance	0456789	じす "5. STANDARD COMMANDS"	
Cus ft) 0000000 to 3280833 GT, DS-200i, MS05AX II /MS1AX II , MS1005 Range (11H): (ft) 0000000 to 3280839 (US ft) 0000000 to 3280833 (US ft) 00000000 to 3280833 (US ft) 00000000 to 32808338 (US ft) 00000000 to 32808333 (US ft) 00000000 to 3399998 (mil) 00000000 to 33999998 (mil) 00000000 to 339999998 (mil) 00000000 to 339999998 (mil) 00000000 to 339999998 (mil) 000000000 to 339999998 (mil) 00000000000 to 339999998 (mil) 000000000 to 339999998 (mil) 000000000000000000000000000000000000				Range (11H): (m) 0000000 to 9999999	
GT, DS-200i, MS05AX II /MS1AX II , MS1005 Range (11H): (ft) 0000000 to 3280839 (US ft) 0000000 to 3280833 12345678 Units: m Range (14H): (ft) 00000000 to 32808398 (US ft) 00000000 to 32808333 2 Space 1 byte 3 Vertical angle 0895942 IF 5. STANDARD COMMANDS" Range (11H): (dms) 0000000 to 3595959 (gon) 0000000 to 3999998 (mil) 00000000 to 35959599 (gon) 00000000 to 35959599 (gon) 00000000 to 35959599 (gon) 00000000 to 35959599 (gon) 00000000 to 3999998 (mil) 00000000 to 3999998 (mil) 00000000 to 35959599 (gon) 00000000 to 35999998 (mil) 00000000 to 35959599				(ft) 0000000 to 3280839	
Range (11H): (ft) 0000000 to 3280839 (US ft) 0000000 to 3280833 12345678 Units: m Range (14H): (ft) 00000000 to 32808398 (US ft) 00000000 to 32808398 (US ft) 00000000 to 32808333 2 Space 1 byte 3 Vertical angle 0895942				(US ft) 0000000 to 3280833	
CUS ft) 0000000 to 3280833 12345678 Units: m Range (14H): (ft) 00000000 to 32808398 (US ft) 00000000 to 32808333 2 Space				GT, DS-200i, MS05AX II /MS1AX II , MS1005	
12345678 Units: m Range (14H): (ft) 00000000 to 32808398 (US ft) 000000000 to 32808333 2 Space				Range (11H): (ft) 0000000 to 3280839	
Range (14H): (ft) 00000000 to 32808398 (US ft) 00000000 to 32808333 2 Space 1 byte 3 Vertical angle 0895942				(US ft) 0000000 to 3280833	
Cus ft) 000000000 to 32808333 2 Space 1 byte 0895942 STANDARD COMMANDS" Range (11H): (dms) 0000000 to 3595959 (gon) 0000000 to 36399995 (mil) 0000000 to 6399995 (gon) 00000000 to 35959599 (gon) 00000000 to 35959599 (gon) 00000000 to 3999998 (mil) 00000000 to 3999998 (mil) 00000000 to 6399995 (mil) 00000000 to 35959599 (gon) 00000000 to 35959599 (gon) 0000000 to 35959599 (gon) 0000000 to 35959599 (gon) 0000000 to 3999998 (mil) 00000000 to 35959599 (gon) 000000000 to 35959599 (gon) 000000000 to 35959599 (gon) 000000000 to 35959599 (gon) 000000000 to 35959599 (gon) 0000000000 to 35959599 (gon) 000000000 to 35959599 (gon) 00000000000000 to 359595999 (gon) 000000000000000000000000000000000000			12345678	Units: m	
2 Space 1 byte 0895942				Range (14H): (ft) 00000000 to 32808398	
3 Vertical angle 0895942				(US ft) 00000000 to 32808333	
Range (11H): (dms) 0000000 to 3595959 (gon) 0000000 to 3999998 (mil) 0000000 to 6399995 08959425	2	Space	1 byte		
(gon) 0000000 to 3999998 (mil) 0000000 to 6399995 08959425	3	Vertical angle	0895942	じず "5. STANDARD COMMANDS"	
(mil) 0000000 to 6399995 08959425				Range (11H): (dms) 0000000 to 3595959	
08959425				(gon) 0000000 to 3999998	
Range (14H): (dms) 00000000 to 35959599 (gon) 000000000 to 39999998 (mil) 00000000 to 63999995 4 Space 1 byte 5 Horizontal angle 1243159				(mil) 0000000 to 6399995	
(gon) 00000000 to 39999998 (mil) 00000000 to 63999995 4 Space 1 byte 5 Horizontal angle 1243159			08959425	🖙 "5. STANDARD COMMANDS"	
(mil) 00000000 to 63999995 4 Space 1 byte 5 Horizontal angle 1243159				Range (14H): (dms) 00000000 to 35959599	
4 Space 1 byte 5 Horizontal angle 1243159				(gon) 00000000 to 39999998	
5 Horizontal angle 1243159				(mil) 00000000 to 63999995	
5 Horizontal angle 1243159					
Range (11H): (dms) 0000000 to 3595959 (gon) 0000000 to 3999998 (mil) 0000000 to 6399995 12345455	4	Space	1 byte		
(gon) 0000000 to 3999998 (mil) 0000000 to 6399995 12345455	5	Horizontal angle	1243159	🖙 "5. STANDARD COMMANDS"	
(mil) 0000000 to 6399995 12345455				Range (11H): (dms) 0000000 to 3595959	
12345455				(gon) 0000000 to 3999998	
Range (14H): (dms) 00000000 to 35959599 (gon) 00000000 to 39999998 (mil) 00000000 to 63999995				(mil) 0000000 to 6399995	
(gon) 00000000 to 39999998 (mil) 00000000 to 63999995			12345455	🕼 "5. STANDARD COMMANDS"	
(mil) 00000000 to 63999995				Range (14H): (dms) 00000000 to 35959599	
				(gon) 00000000 to 39999998	
6 Space 1 byte				(mil) 00000000 to 63999995	
	6	Space	1 byte		



Error

Time for command reception is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

E200 0895942 1243159 <cr><lf>

Instruments

<11H>

GT

DS-200i

<11H> <14H> MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H

Note: <Total Station>

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Distance data can also be obtained using Ea, *ST2, *ST3, and *ST4. See explanation for relevant command.

When set to single measurement mode (single, fine single, rapid single etc.), a stop command is not required because distance measurement and data output stops when distance measurement data has been output.

[Slope distance field]

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



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Note:

<MS>

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

When set to single measurement mode (single, fine single, rapid single etc.), a stop command is not required because distance measurement and data output stops when distance measurement data has been output.

[Slope distance field]

However, when an asterisk is displayed, "0000000", i.e. no distance measurement, is output. (Only MS05AX/MS1AX)

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



5.3 12H - Distance measurement stop request

Send record

12H

Send field

No	Category	Example	Notes	Omit
1	Data identifying	12H		
	code			

Receive record

None

Field

None

Error

None

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

11H, 14H, Ea, Eb, Ec, Ed, Ee, Ef, Eg, Ga, Gb, Gc, Gd, Ge, Gf



6. OUTPUT COMMANDS

Field format

Angle fields (vertical angle/horizontal angle) are output with a decimal point following degree "o" value.

Angle field 359.5959 → 359°59'59"

Field format for angle fields (vertical angle/horizontal angle) and distance fields (coordinates, distance, height, etc.) will be displayed as described in "3. CONVENTIONS USED IN THIS MANUAL".

Checksum data

To calculate the checksum, add every 8-bit of data from the start of the data to the space (20H), including commas (2CH), before the checksum. The checksum is the last two significant digits of the total represented as 2 bytes of ASCII code.

Checksum output example: A DS-203,123456,4100,2506,31<cr><f>Calculation example: 41+20+44+53+2D+32+30+33+.....+2C=531H For a checksum 31output, 33H, 31H in ASCII code is output.

Instrument display

Entered values are displayed in the display units selected on the instrument.

On those instruments for which "inch" can be selected, distance value must be input in "feet".



6.1. A - Instrument ID output

Send record

A<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Α		
	code			

Receive record

A GT-1003,GW000001,0022,8872<cr><lf>

A GT-1003, GW000001,0022,8872,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Α		
	code			
2	Space	1 byte		
3	Instrument	GT-1003		
	name			
4	Serial number	GW0000		
		01		
5	TS/ MS ROM	0022	4 digits	
	Ver.			
6	EDM ROM Ver.	8872	4 digits	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

MS1005

Instrument type restrictions

No.4 Serial number is 6-digit number output for MS05AX/MS1AX.

Related items

None



6.2. B - Instrument parameter settings output

Send record

B<cr>

Send field

Ν	o Category	Example	Notes	Omit
	1 Data identifying	В		
	code			

Receive record

<Total Station>

B 0,0,0,-30,0,0,0,0,0,0,0,0<cr><lf>

B 0,0,0,-30,0,0,0,0,0,0,0,0,sum<cr><lf>

<MS>

B 0,0,0,-30.0,0,0,0,0,0,0,0,0<cr><lf>

B 0,0,0,-30.0,0,0,0,0,0,0,0,0,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	В		
	code			
2	Space	1 byte		
3	Distance	0	0: meters	
	measurement		1: feet	
	units		🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
4	Temperature	0	0: °C / hPa	
	and Pressure		1: °C / mmHg	
	units		2: °F / hPa	
			3: °F / mmHg	
			4: °F/ inchHg	
			5: °C / inchHg	
5	C&R correction	0	0: None	
			1: Applied (K=0.142)	
			2: Applied (K=0.20)	
			3: Applied (K=Voluntary)	
6	Prism constant	-30	See table below	
7	Angle	0	0: degree	
	measurement		1: gon	
	units		2: mil	
			🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
8	Angle resolution	0	0: high resolution	
			1: low resolution	
			C 3. CONVENTIONS USED IN THIS	
			MANUAL"	



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9	Vertical angle	0	0: Zenith 0°	
	display		1: Horizontal 0°	
			2: Horizontal ±90°	
10	Vertical circle	0	0: Auto	
	indexing		1: Manual	
11	Tilt angle	0	0: Yes	
	compensation		1: No	
			2: Vertical angle only	
12	Horizontal circle	0	0: Auto	
	indexing		1: Manual	
13	Coordinates	0	0: N- E- Z	
	format		1: E- N- Z	
14		0	0 to 9: Reserved	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

<Absolute encoder instruments>

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

3: Applied (K= Voluntary) in No.5 C&R correction is only available for the GT. Howerver, this item cannot be set using /B.

The telescope does not need to be rotated when "0: Auto" set in No. 10 Vertical circle Indexing for instruments with absolute encoders.

No. 12 Horizontal circle indexing field is always "0: Auto" for instruments with absolute encoders.

Only GT, DS-200i, MS05AX II /MS1AX II and MS1005 support Temperature and Pressure unit:5.

Related items

/B, C, /C

Note [Prism constant display (range)]

Instrument type	В	*PG
GT	1mm (-99 to 99)	1mm (-99 to 99)
DS-200i		(When distance resolution
		is 0.1 mm or less:
		0.1mm (-99.9 to 99.9))
MS05AX/MS1AX	0.1mm (-99.9 to 99.9)	1mm (-99 to 99)
MS05AX II /MS1AX II		(When distance resolution
MS1005		is 0.1 mm or less:
		0.1mm (-99.9 to 99.9))



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N.B.

Prism constant set to 0 (0.0) when reflectorless set as Reflector type.

Note:

- Reflector and prism constant can also be obtained using *PG. *PG can be used to obtain prism aperture and supports the 360° prism. *PG is recommended for supporting instruments.
- Angle resolution can also be obtained using Dk. Dk can be used to obtain distance resolution. Dk is recommended for supporting instruments.



6.3. C - Reflector output

Send record

C<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	С		
	code			

Receive record

C 0<cr><lf>

C 0,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	С		
	code			
2	Space	1 byte		
3	Reflector	0	0: Prism	
			1: Sheet	
			2: Reflectorless	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

B, /B, /C, *PG, */PG

Reflector and prism constant can also be obtained using *PG. *PG can be used to obtain prism aperture and supports the 360° prism. *PG is recommended for supporting instruments.



6.4. Da - Instrument station coordinates output

Send record

Da<cr>

Send field

Ν	o Category	Example	Notes	Omit
	1 Data identif	fying Da		
	code			

Receive record

Da 1234.567,-123.567,12.123<cr><lf>Da 1234.567,-123.567,12.123,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Da		
	code			
2	Space	1 byte		
3	Instrument	1234.567	『 "3. CONVENTIONS USED IN THIS	
	station N/E		MANUAL"	
	coordinate			
4	Instrument		『3. CONVENTIONS USED IN THIS	
	station E/N	-1234.567	MANUAL"	
	coordinate			
5	Instrument	12.123	『 "3. CONVENTIONS USED IN THIS	
	station Z		MANUAL"	
	coordinate			
			Left blank when <null></null>	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Instrument station Z coordinate.

Related items

/Da



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Note: The order in which coordinates are output for No. 3 Instrument station N/E coordinate and No. 4 Instrument station E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.5. Db - Distance and horizontal angle setting-out data output

Send record

Db<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Db		
	code			

Receive record

Db 64.960,45.3000<cr><lf>Db 64.960,45.3000,sum<cr><lf>>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Db		
	code			
2	Space	1 byte		
3	Distance	64.960	じず "3. CONVENTIONS USED IN THIS	
	setting-out data		MANUAL"	
4	Horizontal angle	45.3000	じず "3. CONVENTIONS USED IN THIS	
	setting-out data		MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

On versions GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005, setting-out distance data can be input in various modes: slope distance, horizontal distance, height difference and REM distance. Setting-out distance is displayed in the present distance when this command is received. However, horizontal distance is displayed in coordinate mode.

Related items

/Db, Ga, Gb, Gc, Gd, Gf



6.6. Dd - Backsight station coordinates output

Send record

Dd<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dd		
	code			

Receive record

Dd 1234.567,-123.567,1.520<cr><lf>Dd 1234.567,-123.567,1.520,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Dd		
	code			
2	Space	1 byte		
3	Backsight	1234.567	☐ "3. CONVENTIONS USED IN THIS	
	station N/E		MANUAL"	
	coordinate			
4	Backsight	-123.567	ICF "3. CONVENTIONS USED IN THIS	
	station E/N		MANUAL"	
	coordinate			
5	Backsight	1.520	『 "3. CONVENTIONS USED IN THIS	
	station Z		MANUAL"	
	coordinate			
			Left blank when <null></null>	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Instrument station Z coordinate.

Related items

/Dd, Xi



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The order in which coordinates are output for No. 3 Backsight station N/E coordinate and No. 4 Backsight station E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.7. De - Instrument and target heights, temperature, pressure and ppm output

Send record

De<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	De		
	code			

Receive record

De 1.500, 1.500, 20, 1015, 4<cr><lf>De 1.500, 1.500, 20, 1015, 4, sum<cr><lf>>

Field

No	Category	Example	Notes	Omit
1	Data identifying	De		
	code			
2	Space	1 byte		
3	Instrument	1.500	『 "3. CONVENTIONS USED IN THIS	
	height		MANUAL"	
4	Target height	1.500	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
5	Temperature	20	See table below	
6	Pressure	1015	See table below	
7	ppm	4	See table below	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

/De, Di, /Di



Note [Temperature display (range)]

Instrument type	De	Di
DS-200i	1°C (-30 to 60)	(Min. distance display = 1mm)
MS 1AX/ MS 1AX II	/1°F (-22 to 140)	1°C (-30 to 60)
		/1°F (-22 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-30.0 to 60.0)
		/0.1°F (-22.0 to 140.0)
GT	1°C (-35 to 60)	(Min. distance display = 1mm)
	/1°F (-31 to 140)	1°C (-35 to 60)
		/1°F (-31 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-35.0 to 60.0)
		/0.1°F (-31.0 to 140.0)
MS05AX/MS05AX II	1°C (-30 to 60)	0.1°C (-30.0 to 60.0)
MS1005	/1°F (-22 to 140)	/0.1°F (-22.0 to 140.0)

N.B.

Unit can be switched between °C/° F using /B.

[Pressure display (range)]

Instrument type	De	Di
GT	1hPa (500 to 1400)/	(Min. distance display = 1mm)
DS-200i	1mmHg (375 to 1050)/	1hPa (500 to 1400)/
MS1AX/MS1AX II	0.1 inchHg (14.8 to 41.3)	1mmHg (375 to 1050)/
		0.1 inchHg (14.8 to 41.3)
		(Min. distance display =
		0.1mm)
		0.1hPa (500.0 to 1400.0)/
		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)
MS05AX/MS05AX II		0.1hPa (500.0 to 1400.0)/
MS1005		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)

N.B.

Unit can be switched between hPa/mmHg/inchHg using /B.

[ppm display (range)]

Instrument type	De	Di
GT	1 (-499 to 499)	(Min. distance display = 1mm)
DS-200i		1 (-499 to 499)
MS1AX/ MS1AX II		(Min. distance display =
		0.1mm)
		0.1 (-499.9 to 499.9)



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MS05AX/MS05AX II	0.1 (-499.9 to 499.9)	
MS1005		

Note: Temperature, pressure and ppm values can also be obtained using Di. Di can also be used to obtain humidity values. Di command is recommended for supporting instruments.

6.8. Df - Coordinates setting-out data output

Send record

Df<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Df		
	code			

Receive record

Df 1234.567,-12.345,9.182<cr><lf>

Df 1234.567,-12.345,9.182,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Df		
	code			
2	Space	1 byte		
3	Setting-out N/E	1234.567		
	coordinate		MANUAL"	
4	Setting-out E/N	-12.345	☐ "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
5	Setting-out Z	9.182	🖙 "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
			Left blank when <null></null>	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Instrument station Z coordinate.

Related items

/Df, Ge



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Note: The order in which coordinates are output for No. 3 Setting-out N/E coordinate and No. 4 Setting-out E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.9. Di - Atmospheric data output

Send record

Di<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Di		
	code			

Receive record

Di 15, 1013, 50, 0<cr><lf>Di 15, 1013, 50, 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Di		
	code			
2	Space	1 byte		
3	Temperature	15	See table below	
4	Pressure	1013	See table below	
5	Humidity	50	See table below. Space is "50%"	
6	ppm	0	See table below	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

/Di, De, /De



Note [Temperature display (range)]

Instrument type	De	Di
DS-200i	1°C (-30 to 60)	(Min. distance display = 1mm)
MSAX/MS1AX II	/1°F (-22 to 140)	1°C (-30 to 60)
		/1°F (-22 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-30.0 to 60.0)
		/0.1°F (-22.0 to 140.0)
GT	1°C (-35 to 60)	(Min. distance display = 1mm)
	/1°F (-31 to 140)	1°C (-35 to 60)
		/1°F (-31 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-35.0 to 60.0)
		/0.1°F (-31.0 to 140.0)
MS05AX/MS05AX II	1°C (-30 to 60)	0.1°C (-30.0 to 60.0)
	/1°F (-22 to 140)	/0.1°F (-22.0 to 140.0)

N.B.

Unit can be switched between °C/° F using /B.

[Pressure display (range)]

Instrument type	De	Di
GT	1hPa (500 to 1400)/	(Min. distance display = 1mm)
DS-200i	1mmHg (375 to 1050)/	1hPa (500 to 1400)/
MS1AX/MS1AX II	0.1 inchHg (14.8 to 41.3)	1mmHg (375 to 1050)/
		0.1 inchHg (14.8 to 41.3)
		(Min. distance display =
		0.1mm)
		0.1hPa (500.0 to 1400.0)/
		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)
MS05AX/MS05AX II		0.1hPa (500.0 to 1400.0)/
MS1005		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)

N.B.

Unit can be switched between hPa/mmHg/inchHg using /B.



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Note [Humidity display (range)]

Instrument type	De	Di
GT	_	(Min. distance display = 1mm)
DS-200i		1 (0 to 100)
MS1AX/ MS 1AX II		(Min. distance display = 0.1mm)
		0.1(0.0 to 100.0)
MS05AX/MS05AX II		0.1(0.0 to 100.0)
MS1005		

[ppm display (range)]

Instrument type	De	Di
GT	1 (-499 to 499)	(Min. distance display = 1mm)
DS-200i		1 (-499 to 499)
MS1AX/MS1AX II		(Min. distance display = 0.1mm)
		0.1 (-499.9 to 499.9)
MS05AX/MS05AX II		0.1 (-499.9 to 499.9)
MS1005		

Note: Temperature, pressure and ppm values can also be obtained using De. Use De for instruments not supporting Di.



6.10. Dj - Collimation correction setting output

Send record

Dj<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dj		
	code			

Receive record

Dj 0<cr><lf>

Dj 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Dj		
	code			
2	Space	1 byte		
3	Collimation	0	0: Yes	
	correction		1: No	
	setting			

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

/Dj



6.11. Dk - Distance and angle display resolution setting output

Send record

Dk<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dk		
	code			

Receive record

Dk 0, 0<cr><lf>

Dk 0, 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Dk		
	code			
2	Space	1 byte		
3	Minimum	0	0: High	
	distance display		1: Low	
			2 to 9: Reserved	
			☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
4	Minimum angle	0	0: High	
	display		1: Low	
			2 to 9: Reserved	
			☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

/Dk



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Angle display resolutions can also be obtained using B. Use B for instruments not supporting Dk.

6.12. DI - Error code/detail code setting output

Send record

DI<cr>

Send field

No	Category	Example	Notes	Omit	
1	Data identifying	DI			
	code				

Receive record

DI 0,0,0,0,0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	DI		
	code			
2	Space	1 byte		
3	Output error	0	0: Error code	
	code		1: Detail code	
			2 to 9: Reserved	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

/DI, Ea, *ST2, SJ



6.13. Dm – Angle resolution and motor drive functionality data output

Send record

Dm<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dm		
	code			

Receive record

Dm 2,1,1,1,1,0,0,0,0,0,0,0 sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying code	Dm		
2	Space	1 byte		
3	Angle resolution	0	0: 0.2" 1: 0.5" (MS05AX/MS05AX II /MS1005) 2: 1" (1" models/MS1AX/MS1AX II)	
			3: 2" (2" models)	
			4: 3" (3" models)	
			5: 5" (5" models)	
			7: 7" (7" models)	
4	Motor drive	1	0: None	
			1: Provided	
5	Auto Pointing	1	0: None	
			1: Provided	
6	Auto Tracking	1	0: None	
			1: Provided	
7	Remote Control	1	0: None	
	System		1: Provided	
	functionality			
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	Reserved	0		
12	Reserved	0		
13	Reserved	0		
14	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

None



6.14. Dn – Beep sound status output

Send record

Dn<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dn		
	code			

Receive record

Dn 0,0,0,0,0<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Dn		
	code			
2	Space	1 byte		
3	Beep sound	0	DS-200i, MS05AX/MS1AX, MS1005	
	volume		0: Off, 3: On	
			GT, MS05AX II /MS1AX II	
			0: Off	
			1: (small) to 5: (big)	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		

Error

NAK (15H)

Time for command transmission is 1 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1114-x2-23 or later)

MS05AX II /MS1AX II

MS1005

Instrument type restrictions

Beep sound volume is fixed at 3 for the DS-200i, MS05AX/MS1AX and MS1005.

Related items

None



6.15. Do -LCD backlight status output

Send record

Do<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Do		
	code			

Receive record

Do 1,5,0,0,0,0,0<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Do		
	code			
2	Space	1 byte		
3	Backlight	1	0: (dark) to 8: (bright)	
	brightness			
	(at reticle			
	illumination on)			
4	Backlight	5	0: (dark) to 8: (bright)	
	brightness			
	(at reticle			
	illumination off)			
5	Auto adjustment	0	0: Manual	
	of backlight		1: Auto	
	brightness			
	(at reticle			
	illumination off)			
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		

Error

NAK (15H)

Time for command transmission is 1 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1114-x2-23 or later) MS05AX II /MS1AX II

MS1005



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Instrument type restrictions

None

Related items

None

In case auto adjustment of backlight brightness set "Auto", the backlight brightness(at reticle illumination off) is changed automatically regardless of the value which you set there.



6.16. Dp – Version information output

Send record

Dp<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Dp		
	code			

Receive record

Dp 1.24EN_00,2.14EN,1.31_01,1.06_01,1088-40-10,1.04_01,,,,[,sum]<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Dp		
	code			
2	Space	1 byte		
3	Basic mode	1.24		
	version			
4	OS version	2.14EN_		
		00		
5	DCPU version	1.31_01		
6	MDCPU version	1.06_01		
7	TIPU version	1088-40-		
		10		
8	EDM version	1.04_01		
9	Reserved	0		
10	Reserved	0		_
11	Reserved	0		
12	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

None



6.17. Ds - Distance, angle and tracking display resolution setting output

Send record

Ds<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ds		
	code			

Receive record

Ds 0, 0, 0, 0, 0, 0<cr><lf>

Ds 0, 0, 0, 0, 0, 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ds		
	code			
2	Space	1 byte		
3	Minimum	0	0: High	
	distance display		1: Low	
			2 to 9: Reserved	
			🕼 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
4	Minimum angle	0	0: High	
	display		1: Low	
			2 to 9: Reserved	
			☼ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
5	Minimum	0	0: High	
	tracking display		1: Low	
			☼ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

Instrument type restrictions

None



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Related items /Ds



6.18. Ea - Slope distance, vertical, horizontal, angle data output

Send record

Ea<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ea		
	code			í

Receive record

Ea 0000,0,1.500,4,64.964,89.5959,359.5959<cr><lf>Ea 0000,0,1.500,4,64.964,89.5959,359.5959,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ea		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	Slope distance	64.964	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
8	Zenith angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
	(vertical angle)		MANUAL"	
9	Horizontal angle	359.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field. Ea 0000,0,1.500,4,E200,E115,359.5959<cr><lf>



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H

Note: [Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Slope distance data can also be obtained using 11H, 14H, *ST2, *ST3, and *ST4. See explanation for relevant command.

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.19. Eb - Horizontal distance, vertical and horizontal angles data output

Send record

Eb<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Eb		
	code			

Receive record

Eb 0000,0,1.500,4,64.964,89.5959,359.5959<cr><lf>

Eb 0000,0,1.500,4,64.964,89.5959,359.5959,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Eb		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	Horizontal	64.964	☐ "3. CONVENTIONS USED IN THIS	
	distance		MANUAL"	
8	Zenith angle	89.5959	🖙 "3. CONVENTIONS USED IN THIS	
	(vertical angle)		MANUAL"	
9	Horizontal angle	359.5959	🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H

Note: [Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.20. Ec - Height difference, vertical and horizontal angles data output

Send record

Ec<cr>

Send field

1	N٥	Category	Example	Notes	Omit
	1	Data identifying	Ec		
		code			

Receive record

Ec 0000,0,1.500,4,-5.123,89.5959,359.5959<cr><lf>

Ec 0000,0,1.500,4,-5.123,89.5959,359.5959,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ec		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	Height	-5.123	🖙 "3. CONVENTIONS USED IN THIS	
	difference		MANUAL"	
8	Zenith angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
	(vertical angle)		MANUAL"	
9	Horizontal angle	359.5959	🕼 "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H

Note: [Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.21. Ed - N, E, Z coordinates output

Send record

Ed<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ed		
	code			í

Receive record

Ed 0000,0,1.500,4,123.456,-234.567,1.234<cr><lf>Ed 0000,0,1.500,4,123.456,-234.567,1.234,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying code	Ed		
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	N/E coordinate	123.456	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
8	E/N coordinate	-234.567	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
9	Z coordinate	1.234	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
			Left blank when <null></null>	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 9 Z coordinate.

Related items

12H

Note: [Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".

The order in which coordinates are output for No. 7 N/E coordinate and No. 8 E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.22. Ee - Vertical, horizontal, X-tilt, Y-tilt angles data output

Send record

Ee<cr>

Send field

No	Category	Example	Notes	Omit	
1	Data identifying	Ee			
	code				

Receive record

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ee		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	Zenith angle	89.5959	CF "3. CONVENTIONS USED IN THIS	
	(Vertical angle)		MANUAL"	
8	Horizontal angle	359.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
9	X-tilt angle	-0.0032	Units: degree	
			Range: -0.0330 to 0.0330	
			(GT, DS-200i: -0.0630 to 0.0630)	
			(MS05AX II /MS1AX II , MS1005:	
			-0.15000 to 0.15000)	
10	Y-tilt angle	0.0216	Units: degree	
			Range: -0.0330 to 0.0330	
			(GT, DS-200i: -0.0630 to 0.0630)	
			(MS05AX II /MS1AX II , MS1005:	
			-0.15000 to 0.15000)	



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Error

NAK (15H)

Time for command transmission is 2 sec.

When an error occurs in angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

None

Angle data can also be obtained using 00H, 13H, and *ST1. See explanation for relevant command.



6.23. Ef - REM data output

Send record

Ef<cr>

Send field

Ν	0	Category	Example	Notes	Omit
	1	Data identifying	Ef		
		code			

Receive record

Ef 0000,0,4,70.5959,5.218<cr><lf>Ef 0000,0,4,70.5959,5.218,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ef		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: degree, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
			0: Right, 1: Left	
4		0	Always 0	
5	ppm	4	Range: -499 to 499	
6	Zenith angle	70.5959	☐ "3. CONVENTIONS USED IN THIS	
	(Vertical angle)		MANUAL"	
8	REM data	5.218	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec.

When observation of the base point target is incomplete, the total station will transmit a NAK response.

When an error occurs in angle measurement, "E###" is output in the affected field.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

To stop the measurement, "12H" is necessary regardless of the distance measurement mode in EDM setting.

Related items

12H



6.24. Eg - Missing line data output

Send record

Eg<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Eg		
	code			

Receive record

Eg 0000,0,4,24.896,24.845,-1.234<cr><lf>

Eg 0000,0,4,24.896,24.845,-1.234,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying code	Eg		
2	Space	1 byte		
3	Status	0000	Each digit signifies in order: Distance units 0: meters, 1: feet Angle units 0: degree, 1: gon, 2: mil Vertical angle display 0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal ±90° Horizontal angle display	
4		0	0: Right, 1: Left Always 0	
5	ppm	4	Range: -499 to 499	
6	Slope distance between the two points	24.896	** "3. CONVENTIONS USED IN THIS MANUAL"	
7	Horizontal distance between the two points	24.845	ぽ "3. CONVENTIONS USED IN THIS MANUAL"	
8	Height difference between the two points	-1.234	© "3. CONVENTIONS USED IN THIS MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When observation of the starting position is incomplete, the total station will transmit a NAK response.



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When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H, Xo

Note:

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.25. Eh - Telescope orientation output

Send record

Eh<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Eh		
	code			

Receive record

Eh 0<cr><lf>

Eh 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Eh		
	code			
2	Space	1 byte		
3	Telescope	0	0: Face 1	
	orientation		1: Face 2	

Error

NAK (15H)

Time for command transmission is 2 sec.

When an error occurs in angle measurement, "Exxx" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

None



6.26. Ei - Slope distance, N, E, Z coordinates output

Send record

Ei<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ei		
	code			

Receive record

Ei 0000, 0, 1.500, 4,100.000, 90.0000, 0.0000, 1.000, 2.000, 3.000<cr><lf>Ei 0000, 0, 1.500, 4,100.000, 90.0000, 0.0000, 1.000, 2.000, 3.000, sum<cr><lf>>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ei		
	code			
2	Space	1 byte		
3	Status	0000	Each digit signifies in order:	
			Distance units	
			0: meters, 1: feet	
			Angle units	
			0: DDDMMSS, 1: gon, 2: mil	
			Vertical angle display	
			0: Zenith 0°, 1: Horizontal 0°, 2: Horizontal	
			±90°	
			Horizontal angle display	
_		_	0: Right, 1: Left	
4		0	Always 0	
5	Target height	1.500	(3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	ppm	4	Range: -499 to 499	
7	Slope distance	100.000	© "3. CONVENTIONS USED IN THIS MANUAL"	
8	Zenith angle	90.000	☐ "3. CONVENTIONS USED IN THIS	
	(vertical angle)		MANUAL"	
9	Horizontal angle	0.0000	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
10	N/E coordinates	1.000	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
11	E/N coordinates	2.000	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
12	Z coordinate	3.000	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
			Left blank when <null></null>	



Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "Exxx" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H

Note :

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10.

Instrument Settings and Trigger Key Operation"

The order in which coordinates are output for No. 10 N/E coordinates and No. 11 E/N coordinates can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.27. Ej – Battery information output

Send record

Ej<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ej		
	code			

Receive record

Ej 0,0,90,8.1,0,0,0,0<cr><lf>

Ej 0,0,90,8.1,0,0,0,0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ej		
	code			
2	Space	1 byte		
3	Battery type	0	0: Internal	
			1: External	
4	Battery status	0	0: Normal	
			1: Low battery	
5	Battery	90	0 to 100 (%)	
	remaining power			
6	Voltage	8.1	Displayed in volts to 1 decimal place	
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

None



6.28. Ek – Instrument internal temperature output

Send record

Ek<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Ek		
	code			

Receive record

Ek 15.6,0,0,0,0[,sum]<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ek		
	code			
2	Space	1 byte		
3	Instrument	15.6	Unit is depend on the temperature unit	
	internal		setting. Resolution is fixed to 0.1.	
	temperature			
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

When an error occurs in internal temperature, "E###" is output in the affected field.

Instruments

MS05AX/MS1AX (Ver.1114-x2-25 or later) MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

None



6.29. Ga - Slope distance setting-out data output

Send record

Ga<cr>

Send field

No	Category	Example	Notes	Omit	L
1	Data identifying	Ga			
	code				

Receive record

Ga -2.471,10.218<cr><lf>

Ga -2.471,10.218,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ga		
	code			
2	Space	1 byte		
3	Measured slope	-2.471	🖙 "3. CONVENTIONS USED IN THIS	
	distance		MANUAL"	
	setting-out value			
4	Measured slope	10.218	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H, Db, /Db



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Note:

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.30. Gb - Horizontal distance setting-out data output

Send record

Gb<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Gb		
	code			

Receive record

Gb -2.471,10.218<cr><lf>

Gb -2.471,10.218,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Gb		
	code			
2	Space	1 byte		
3	Measured	-2.471	☐ "3. CONVENTIONS USED IN THIS	
	horizontal		MANUAL"	
	distance			
	setting-out value			
4	Measured	10.218	☐ "3. CONVENTIONS USED IN THIS	
	horizontal		MANUAL"	
	distance			

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H, Db, /Db



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Note:

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.31. Gc - Height difference setting-out data output

Send record

Gc<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Gc		
	code			

Receive record

Gc 1.889,-2.111<cr><lf>

Gc 1.889,-2.111,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Gc		
	code			
2	Space	1 byte		
3	Measured	1.889	🖙 "3. CONVENTIONS USED IN THIS	
	height difference		MANUAL"	
	setting-out value			
4	Measured	-2.111	☐ "3. CONVENTIONS USED IN THIS	
	height difference		MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H, Db, /Db



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Note:

[Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".

6.32. Gd - Horizontal angle setting-out data output

Send record

Gd<cr>

Send field

No	Category	Example	Notes	Omit	L
1	Data identifying	Gd			
	code				

Receive record

Gd -4.5730,49.5730<cr><lf>

Gd -4.5730,49.5730,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Gd		
	code			
2	Space	1 byte		
3	Measured	-4.5730	☐ "3. CONVENTIONS USED IN THIS	
	horizontal angle		MANUAL"	
	setting-out value			
4	Measured	49.5730	☐ "3. CONVENTIONS USED IN THIS	
	horizontal angle		MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec.

When an error occurs in angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005



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Instrument type restrictions

"12H" can be used to stop measurement.

To stop the measurement, "%" is necessary regardless of the distance measurement mode in EDM setting.

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Related items

%, Db, /Db



6.33. Ge - Coordinates setting-out data output

Send record

Ge<cr>

Send field

No	Category	Example	Notes	Omit	L
1	Data identifying	Ge			
	code				

Receive record

Ge 1.528,-2.401,1.408,51.528,47.599,3.408<cr><lf>

Ge 1.528,-2.401,1.408,51.528,47.599,3.408,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Ge		
	code			
2	Space	1 byte		
3	N/E coordinate	1.528	🕼 "3. CONVENTIONS USED IN THIS	
	setting-out value		MANUAL"	
4	E/N coordinate	-2.401	☐ "3. CONVENTIONS USED IN THIS	
	setting-out value		MANUAL"	
5	Z coordinate	1.408	☐ "3. CONVENTIONS USED IN THIS	
	setting-out value		MANUAL"	
			Left blank when <null></null>	
6	Measured N/E	51.528	🖙 "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
7	Measured E/N	47.599	🖙 "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
8	Measured Z	3.408	☐ "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
			Left blank when <null></null>	

Error

NAK (15H)

Time for command transmission is 60 sec (Depends on Search Area when Auto Pointing performed before distance measurement).

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005



Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Z coordinate setting-out value and No. 8 Measured Z coordinate.

Related items

12H, Df, /Df

Note: [Distance measurement mode]

When set to repeat measurement mode, data will continue to be output until stopped with a distance measurement stop request (12H).

Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".

The order in which coordinates are output for No. 3 N/E coordinate setting-out value, No.4 coordinate setting-out value, No. 6 Measured N/E coordinate and No. 7 Measured E/Ncoordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



6.34. Gf - REM setting-out data output

Send record

Gf<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Gf		
	code			

Receive record

Gf -0.782,5.218<cr><lf>

Gf -0.782,5.218,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	Gf		
	code			
2	Space	1 byte		
3	REM setting-out	-0.782		
	value		MANUAL"	
4	Measured REM	5.218	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 2 sec.

When observation of the base point target is incomplete, the instrument will transmit a NAK response.

When an error occurs in distance/angle measurement, "E###" is output in the affected field.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

To stop the measurement, "12H" is necessary regardless of the distance measurement mode in EDM setting.

Related items

12H, Db, /Db



6.35. *KA - Prism check setting output

Send record

*KA<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*KA		
	code			

Receive record

*KA 0<cr><lf>

*KA 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*KA		
	code			
2	Space	1 byte		
3	Prism check	0	0: On	
	status		1: Off	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

*/KA



The prism check feature allows the user to check prism conditions for greater accuracy. When this option is set to "On", returned signal and ALC status are checked before distance measurement is performed. When set to "Off" these checks are not performed.



6.36. *ST1 - Angle data output

Send record

*ST1<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST1		
	code			í

Receive record

*ST1 5,90,359.5959,89.5959,<cr><lf>

*ST1 5,90,359.5959,89.5959,,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST1		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2 : Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7	Reserved		Always null	

Error

NAK (15H)

Time for command transmission is 2 sec.

When an error occurs in angle measurement, "E###" is output in the affected field.

*ST1 5,90,359.5959,E115,<cr><lf>

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005



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Instrument type restrictions

Battery remaining power is displayed in 4 stages.

GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005: 0, 10, 50, 90% Auto Tracking setting and status items 3 to 5 in No.3 are only applicable to the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II Auto Tracking models.

Related items

*ST0, *ST5

Note: Send "*ST0<cr>" to stop output of the data.

Angle data is output in intervals of approximately 0.5 seconds when using the GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II or MS1005.

Angle data can also be obtained using 00H, 13H, and Ee. See explanation for relevant command.



6.37. *ST2 - Distance data output

Send record

*ST2<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST2		
	code			

Receive record

*ST2 5,90,359.5959,89.5959,12.123<cr><lf>

*ST2 5,90,359.5959,89.5959,12.123,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST2		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7	Slope distance	12.123	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

When an error occurs in distance/angle measurement, "E###" is output in the affected field. *ST2 5,90,359.5959,89,5959,E200<cr><lf>

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005



Instrument type restrictions

Battery remaining power is displayed in 4 stages.

GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005: 0, 10, 50, 90% Auto Tracking setting and status items 3 to 5 in No. 3are only applicable to the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II Auto Tracking models.

Related items

*ST0, *ST3, *ST4



[Distance measurement mode]

In repeat measurement, data will continue to be output until "*ST0<cr>" is sent.

*ST2 and *ST3 are both distance data output commands. However, *ST2 performs Auto Pointing before measurement in accordance with the search before distance measurement option. *ST3 is distance measurement only.

Slope distance data can also be obtained using 11H, 14H, Ea, *ST3, and *ST4.

Auto Pointing and Auto Tracking may be added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



6.38. *ST3 - Distance data output without turning

Send record

*ST3<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST3		
	code			í

Receive record

*ST3 5,90,359.5959,89.5959,12.123<cr><lf>

*ST3 5,90,359.5959,89.5959,12.123,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST3		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7	Slope distance	12.123	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Error

NAK (15H)

Time for command transmission is 60 sec.

When an error occurs in distance/angle measurement, "E###" is output in the affected field. *ST35,90,359.5959,89.5959,E200 < r > < lf >



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Battery remaining power is displayed in 4 stages.

GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005: 0, 10, 50, 90%

This command can only be used for instruments combined with the Remote Control system (GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II).

Auto Tracking setting and status items 3 to 5 in No.3 are only applicable to the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II Auto Tracking models.

Related items

*ST0, *ST2, *ST4

Note: [Distance measurement mode]

In repeat measurement, data will continue to be output until "*ST0<cr>" is sent.

*ST2 and *ST3 are both distance data output commands. However, *ST2 performs Auto Pointing before measurement in accordance with the search before distance measurement option. *ST3 is distance measurement only.

Slope distance data can also be obtained using 11H, 14H, Ea, *ST3, and *ST4.



6.39. *ST4 - Specified angle rotation and search/distance measurement request

Send record

*ST4 359.5959,89.5959,12.123,,,<cr>

*ST4 359.5959,89.5959,12.123,,,,sum <cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST4		
	code			
2	Space	1 byte		
3	Specified	359.5959	🖙 "3. CONVENTIONS USED IN THIS	Possible
	horizontal angle		MANUAL"	
4	Specified	89.5959	☐ "3. CONVENTIONS USED IN THIS	Possible
	vertical angle		MANUAL"	
5	Known distance		☐ "3. CONVENTIONS USED IN THIS	Possible
			MANUAL"	
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary

Receive record

*ST4 5,90,359.5959,89.5959,12.123<cr><lf>

*ST4 5,90,359.5959,89.5959,12.123,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST4		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7	Slope distance	12.123	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	



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Error

NAK (15H)

When an error occurs in distance/angle measurement, "E###" is output in the affected field. *ST4 5,90,359.5959,89.5959,E200<cr><lf>

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1114-x2-28 or later) MS05AX II /MS1AX II

Instrument type restrictions

Auto Tracking setting and status items 3 to 5 in No.3 are only applicable to the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II Auto Tracking models.

Send field item "5: Known distance" is only applicable to the MS05AX/MS1AX (Ver.1114-x2-28 or later) and MS05AX $\rm II$ /MS1AX $\rm II$.

Related items

*ST0, *ST2, *ST5



In repeat measurement, data will continue to be output until "*ST0<cr>" is sent.

This command cannot be used with Motor Drive Total Station series when the 2-way commands setting is selected.

Rotation and search operations can be stopped using the "*ST0<cr>" command but not the "*R" command.

Auto Pointing will still be performed even if the input distance value is incorrect but accurate results will not be obtained. No error is displayed to indicate incorrect input.

Auto Pointing speed is slightly faster when the distance to the target is known in advance such as when performing periodic monitoring. (However, defining a known distance does not change the speed when performing Auto tracking after Auto Pointing).

Auto Pointing and Auto Tracking may be added to distance measurement operation depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation"



6.40. *ST5 - Rapid 2D monitoring

Send record

*ST5 359.5959,89.5959,100.000,,,, <cr>

*ST5 359.5959,89.5959,100.000,,,,,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST5		
	code			
2	Space	1 byte		
3	Specified	359.5959	🖙 "3. CONVENTIONS USED IN THIS	Possible
	horizontal angle		MANUAL"	
4	Specified	89.5959	☐ "3. CONVENTIONS USED IN THIS	Possible
	vertical angle		MANUAL"	
5	Specified slope	100.000	☐ "3. CONVENTIONS USED IN THIS	Possible ^{*1}
	distance		MANUAL	
6	Reserved		Omitted	
7	Reserved		Omitted	
8	Reserved		Omitted	
9	Reserved		Omitted	

^{*1:} Set distance to prism in "Specified slope distance" when using Rapid 2D Monitoring. When slope distance is set to 0 or a value equal to or exceeding 100 m, or is omitted entirely, measurement speed shall be similar to that for Auto Pointing.

Receive record

*ST5 0,90,359.5959,89.5959, ,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST5		
	code			
2	Space	1 byte		
3	Auto Tracking	0	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	『 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7			Always null	



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Error

NAK (15H)

Time for command transmission is 90 sec.

Instruments

MS05AX/MS1AX

Instrument type restrictions

None

Related items

*ST1, *ST2, *ST3, *ST4, *ST0, *Q

Rapid 2D Monitoring adds the offset from the reticle center to the prism to the current angle values to determine angles to the prism. Thus this function speeds up angle measurement by removing the need to accurately sight the target at the reticle center.

Auto Tracking is not be performed after Rapid 2D Monitoring is complete regardless of the "Search before distance measurement" setting.

Use the "*ST0<cr>" or "*Q" commands to stop Rapid 2D Monitoring operation. Rotation and search operations cannot be stopped using the "*R" command.

When an error occurs in angle measurement, "E###" is output in the affected field. *ST5 0,90,E114, E115, <cr><lf>

Single measurement only. Only 1 receive record output.

This command can only be operated from a computer connected to the total station when "Controller" is set to "Remote" in the Comms setup tab of <Communication Setup> (see relevant operator's manual).

Motor settings will be disregarded while Rapid 2D Monitoring is in operation.



6.41. *ST6 - Reflector prescan

Send record

*ST6 0.0000,60.0000,89.5959,89.5959,,,, <cr>

*ST6 0.0000,60.0000,89.5959,89.5959,,,,,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST6		
	code			
2	Space	1 byte		
3	Horizontal angle	0.0000	☐ "3. CONVENTIONS USED IN THIS	
	at start		MANUAL"	
4	Vertical angle at	60.0000	Range: 20.0000 to 128.0000,	
	start		232.0000 to 340.0000	
5	Horizontal angle	359.5959	🖙 "3. CONVENTIONS USED IN THIS	
	at finish		MANUAL	
6	Vertical angle at	89.5959	Range: 20.0000 to 128.0000,	
	finish		232.0000 to 340.0000	
7	Reserved		Omitted	
8	Reserved		Omitted	
9	Reserved		Omitted	
10	Reserved		Omitted	

Receive record

*ST6 0,90,1,100,359.5959,89.5959,, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST6		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Prism number	1	1 to 100 ("0" when there are no prisms)	
6	Number of	100	0 to 100	
	prisms			
7	Horizontal angle	59.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
8	Vertical angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
9			Always null	



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Error

NAK (15H)

Time for command completion depends on Search Area.

Instruments

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*ST0, *Q

Reflector Prescan scans the specified angle range and outputs horizontal and vertical angles for all prisms found within 100 m of the total station.

Use the "*ST0<cr>" or "*Q" commands to stop Reflector Prescan operation. Rotation and Prescan operations cannot be stopped using the *R command. Output of receive field not stopped.

"0" output for fields 5 and 6 when no prisms found.

*ST6 0,90,0,0,,, <cr><lf>

When an error occurs in angle measurement, "E###" is output in the affected field.

*ST6 0,90,1,100,E114, E115, <cr><lf>

Up to 100 prisms can be detected for each execution of this command.

1 receive record output for each prism found (Max.: 100).

This command can only be operated from a computer connected to the total station when "Controller" is set to "Remote" in the Comms setup tab of <Communication Setup> (see relevant operator's manual).



6.42. *ST9 – R/L observation request

Send record

*ST9 359.5959,89.5959,12.123,,,[,sum]<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST9		
	code			
2	Space	1 byte		
3	Specified	359.5959	🖙 "3. CONVENTIONS USED IN THIS	Possible
	horizontal angle		MANUAL"	
4	Specified	89.5959	☐ "3. CONVENTIONS USED IN THIS	Possible
	vertical angle		MANUAL"	
5	Known distance		☐ "3. CONVENTIONS USED IN THIS	Possible
			MANUAL"	
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary

Receive record

*ST9 5,90,359.5959,89.5959,12.123<cr><lf>

*ST9 5,90,359.5959,89.5959,12.123,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*ST9		
	code			
2	Space	1 byte		
3	Auto Tracking	5	0: None	
	setting and		2: Auto Pointing On	
	status		3: Auto Tracking Off	
			4: Auto Tracking Prism Wait	
			5: Auto Tracking in progress	
			6 to 9: Reserved	
4	Battery	90	Units: %	
	remaining power		Range: 0 to 100	
5	Horizontal angle	359.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Vertical angle	89.5959	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
7	Slope distance	12.123	☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	



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Error

NAK (15H)

Time for command transmission depends on the search area.

Instruments

MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*ST4, *ST0

Note: Two receive records (R/L) are output.

When an error occurs in distance/angle measurement/motor drive functionality, "E###" is output in the affected field and the operation is completed irregularly. It can happen that only one record is output.

*ST9 5,90,359.5959,89.5959,E200<cr><lf>

R/L observation can be stopped using the "*ST0<cr>" command or "*Q" command but not the "*R" command even when rotation and search operations.

Auto Pointing speed is slightly faster when the distance to the target is known in advance such as when performing periodic monitoring.

Auto Pointing will still be performed even if the input distance value is incorrect but accurate results will not be obtained. No error is displayed to indicate incorrect input.

Auto Tracking is not be performed after R/L observation is complete regardless of the "Search before distance measurement" setting.



6.43. *ST0 - Data output stop request

Send record

*ST0<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*ST0		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 5 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

*ST1, *ST2, *ST3, *ST4, *ST5, *ST6



6.44. *PA - Motor parameter output

Send record *PA<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PA		
	code			

Receive record (GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II)

*PA 1,1,15.0000,15.0000<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PA		
	code			
2	Space	1 byte		
3	Srch method	1	0: None	
			1: G.S.	
			2: R.C.	
			3 to 9: Reserved	
4	Auto Tracking	1	0: Auto Pointing	
	setting		1: Auto Tracking	
			2 to 9: Reserved	
5	Horizontal	15.0000	Units: degree/gon/mil	
	search range		Range: 0.0000 to 360.0000/0.0000 to	
			400.0000/0.000 to 6400.000	
6	Vertical search	15.0000	Units: degree/gon/mil	
	range		Range: 0.0000 to 90.0000/0.0000 to	
			100.0000/0.000 to 1600.000	



^{*}PA 1,1,15.0000,15.0000,sum<cr><lf>

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Receive record (MS1005)

*PA 0,0,1.3000,1.3000<cr><lf>

*PA 0,0,1.3000,1.3000,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PA		
	code			
2	Space	1 byte		
3		0	Always 0	
4		0	Always 0	
5	Horizontal	1.3000	Units: degree/gon/mil	
	search range		Range: 0.0000 to 360.0000/0.0000 to	
			400.0000/0.000 to 6400.000	
6	Vertical search	1.3000	Units: degree/gon/mil	
	range		Range: 0.0000 to 90.0000/0.0000 to	
			100.0000/0.000 to 1600.000	

Note: [Srch method]

When set to "G.S.", the total station will search for the target in the area specified in the Search area tab. When set to "R.C.", the total station will wait for a Turning command to be issued from the RC-Controller before starting Auto Pointing. Such commands can only be received when using instruments incorporating RC handle.

Error

NAK (15H)

Time for command transmission is 2 sec.



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Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

MS05AX/MS1AX

The horizontal and vertical search ranges are as follows. Angle values can be specified in 1° 30' steps.

H search range: 1° 30' to 360° 00' V search range: 1° 30' to 90° 00'

The Auto Tracking item in "Auto Tracking setting" is only applicable to the MS05AX/MS1AX Auto Tracking models.

GT, DS-200i, MS05AX II /MS1AX II

The horizontal and vertical search ranges are as follows. Angle values can be specified in 1° / 1gon / 1mil steps.

H search range: 0° to 180° 00' V search range: 0° to 90° 00'

The Auto Tracking item "1: Auto Tracking" is only applicable to the Auto tracking model GT, DS-200i and MS05AX $\rm II$ /MS1AX $\rm II$.

The Turning item "Search before distance measurement" is fixed to "0: No" to the GT, DS-200i and the MS05AX II /MS1AX II which has neither auto tracking nor auto pointing function.

MS1005

The horizontal and vertical search ranges are fixed at 1° 30'.

The Search method item is set to 0: None.

The Auto Tracking item in "Auto Tracking setting" is set to "0: Auto Pointing".

Related items

*/PA

Note: [Search before distance measurement]

When search before distance measurement is set to "Search" or "Turning", distance measurement is initiated via manual operation of the main unit or an external command: the prism is automatically sighted and distance measurement is carried out.

Refer to "10. Instrument Settings and Trigger Operation".

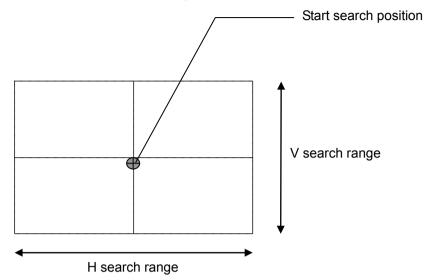
This command cannot be used with Motor Drive Total Station series when the 2-way commands setting is selected.



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Note: [Horizontal and vertical search range]

Horizontal and vertical search range is set as follows.



6.45. *PD - Motor drive positioning accuracy setting output

Send record

*PD<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PD		
	code			

Receive record

*PD 10<cr><lf>

*PD 10,sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PD		
	code			
2	Space	1 byte		
3	Positioning	10	3", 5", 10", 20", 30", or 60"	
	accuracy			

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

Positioning accuracy settings are 5", 10", 20", 30", or 60" for the DS-200i and MS 05AX/ MS 1AX.

Positioning accuracy settings are 3", 5", 10", 20", 30", or 60" for the GT, MS05AX $\rm II$ /MS1AX $\rm II$.

Related items

*/PD, *DHA, *DHI, *DHF

Note: This command cannot be used with Motor Drive Total Station series when the 2-way commands setting is selected.



6.46. *PF - Light function switching enquiry

Send record

*PF<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PF		
	code			

Receive record

*PF 1,1<cr><lf>

*PF 1,1,sum<cr><lf>

Field (GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II, MS1005)

No	Category	Example	Notes	Omit
1	Data identifying	*PF		
	code			
2	Space	1 byte		
3	Light type	1	1: Guide light/LED	
			2: Laser-pointer	
			5: LED&Laser-pointer	
			4 and 6 to 9:Reserved	
4	Brightness	1	1: Dim 2: Normal	
			3: Bright	
			4 to 9:Reserved	
			Brightness is "1" when "Laser-pointer" is set in	
			Light type.	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

DS-200i do not support Light type:1

5: LED&Laser-pointer in No.3 Light type is only available for the MS05AX II /MS1AX II .

Related items

*/PF, *GLON, *GLOFF



6.47. *PG - Reflector type switching enquiry

Send record

*PG <cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PG		
	code			

Receive record

*PG 0,-30,70 <cr><lf>

*PG 0,-30,70,sum<cr><lf>

Field

No	Category	Example	Notes	
1	Data identifying	*PG		
	code			
2	Space	1 byte		
3	Reflector	1	0: Prism 1: Sheet 2: Reflectorless 3: 360°	
			Prism 4: SMR 5 to 99: Reserved	
4	Prism constant	-30	See table below	
			Always "0" for Reflectorless	
5	Prism aperture	70	Units: mm	
			Range: 0 to 999	
			Always "0" for Reflectorless	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

*/PG, B, /B, C, /C



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Note [Prism constant display (range)]

Instrument type	В	*PG
GT	1mm (-99 to 99)	1mm (-99 to 99)
DS-200i		(When distance
		resolution is 0.1
		mm or less:
		0.1mm (-99.9 to
		99.9))
MS05AX/MS1AX	0.1mm (-99.9 to	1mm (-99 to 99)
MS05AX II /MS1AX II	99.9)	(When distance
MS1005		resolution is 0.1
		mm or less:
		0.1mm (-99.9 to
		99.9))

N.B.

Prism constant set to 0 (0.0) when reflectorless set as Reflector type.

Note: Reflector type (except 360° Prism) and prism constant can also be obtained using C and B respectively.



6.48. *PH - Sighting accuracy enquiry

Send record

*PH<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PH		
	code			

Receive record

*PH 0<cr><lf>

*PH 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PH		
	code			
2	Space	1 byte		
3	Sighting	0	0: Fine	
	accuracy		1: Rapid	
			2 to 9: Reserved	

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*/PH, *SJ, *SJ2, *PI, */PI



6.49. *PI - Auto Pointing setting output

Send record

*PI<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PI		
	code			

Receive record

*PI 0, 0, 0, 0, 0, 0, 0, 0<cr><lf>

*PI 0, 0, 0, 0, 0, 0, 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PI		
	code			
2	Space	1 byte		
3	Sighting	0	0: Fine	
	accuracy		1: Rapid	
4	Centering mode	1	0: Standard Centering same as normal Auto	
			Pointing	
			1: Advanced Centering always finishes from	
			fixed position	
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

The Centering mode item is fixed to "0: Standard" to the GT and DS-200i.

Related items

*PH, */PI, */PH



6.50. *PJ - Resume function setting output

Send record

*PJ<cr>

Send field

	No	Category	Example	Notes	Omit
ſ	1	Data identifying	*PJ		
		code			

Receive record

*PJ 0, 0, 0, 0, 0<cr><lf>

*PJ 0, 0, 0, 0, 0, sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PJ		
	code			
2	Space	1 byte		
3	Resume	0	0: On	
	function		1: Off	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*PON, *POFF, */PJ



6.51. *PL - Silent mode - Rotation speed setting output

Send record

*PL <cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PL		
	code			

Receive record

*PL 0,0,0,0,0,0,0,0[,sum]<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	* PL		
	code			
2	Space	1 byte		
3	Vertical rotation	0	0: normal	
	speed		1: 2°/sec	
			2: 4°/ sec	
			3: 8°/ sec	
			4: 16°/ sec	
			5: 32°/ sec	
4	Horizontal	0	0: normal	
	rotation speed		1: 2°/sec	
			2: 4°/ sec	
			3: 8°/ sec	
			4: 16°/ sec	
			5: 32°/ sec	
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		



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Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX (Ver.1114-x2-25 or later) MS05AX ${\rm II}$ /MS1AX ${\rm II}$

Instrument type restrictions

None

Related items

*/PL

6.52. *PM – Auto Pointing limit range setting output

Send record

*PM <cr>

Send field

No	Category	Example	Notes	Omit	
1	Data identifying	*PM			
	code				

Receive record

*PM 3.000,3.000,0,0,0,0[,sum]<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PM		
	code			
2	Space	1 byte		
3	Auto Pointing	3.000	0.001 to 13.000 (Unit: m)	
	horizontal limit			
	range (distance)			
4	Auto Pointing	3.000	0.001 to 13.000 (Unit: m)	
	vertical limit			
	range (distance)			
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

PA、/PA、*/PM

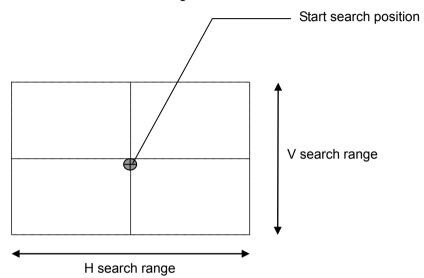


Note: [Horizontal and vertical search range]

This command is available only when horizontal and vertical search range of *PA is in the field of view (1°30').

Auto Pointing horizontal limit range is available only for *SJ2, *SJ3, *ST4, *ST9 which designate distance. The search for Auto Pointing without distance is performed in normal range (in the field of view).

Horizontal and vertical search range is set as follows.



Auto Pointing horizontal limit range should be designated in distance.

Even if Auto Pointing horizontal limit range set to wide, the maximum range is in the field of view (1°30').



6.53. *PQ - Advanced tracking setting output

Send record

*PQ <cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PQ		
	code			

Receive record

*PQ 0, 0,0,0,0,0[,sum]<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Data identifying	*PQ		
	code			
2	Space	1 byte		
3	Forecast time	0	0: 0.5 sec	
			1: 1 sec	
			2: 2 sec	
			3: 3 sec	
			4: 4 sec	
			5: 5 sec	
			9: Auto	
			6 to 8: Reserved	
4	Wait time	0	0 to 3,600 sec	
			9999: No limit	
			3601 to 9998: Reserved	
5	Advanced	0	0: Standard	
	tracking		1: Fixed averaging	
			2 to 9: Reserved	
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

Instrument type restrictions

None



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Related items */PQ



7. INPUT COMMANDS

Instrument display

Entered values are displayed in the display units selected on the instrument.

On those instruments for which "inch" can be selected, distance value must be input in "feet".

\$\mathcal{C}\$ "3. CONVENTIONS USED IN THIS MANUAL"

Field format

For inputting an angle, the decimal point should be entered after the degree value when keying-in an angle value:

E.g. $359^{\circ} 59' 59" \rightarrow 359.5959$

"3. CONVENTIONS USED IN THIS MANUAL"

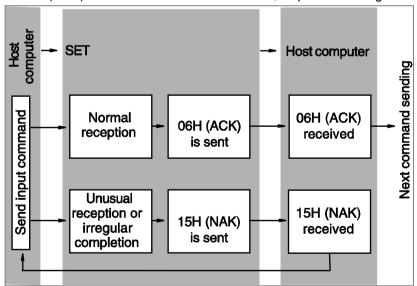
Omitting items

It is possible to omit unnecessary items by leaving the relevant field blank. The setting in the instrument for the omitted item will remain unchanged.

Command transmit and data output

When an input command (/) is transmitted from the host computer to the total station, the total station transmits the reception condition code to the host computer. (ACK/NAK communication control)

- 1. 06H (ACK): Data communication has succeeded, requests sending the next command.
- 2. 15H (NAK): Data communication has failed, requests sending the same command.





7.1. /B - Instrument parameter settings input

Send record

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/B		
	code	4.1.4		
2	Space	1 byte		
3	Distance	0	0: meters	Possible
	measurement		1: feet	
	units		(3. CONVENTIONS USED IN THIS	
	_		MANUAL"	
4	Temperature	0	0: °C / hPa	Possible
	and Pressure		1: °C / mmHg	
	units		2: °F / hPa	
			3: °F / mmHg	
			4: °F/ inchHg	
			5: °C / inchHg	
5	C&R correction	0	0: None	Possible
			1: Applied (K=0.142)	
			2: Applied (K=0.20)	
6	Prism constant	-30	See table below	Possible
7	Angle	0	0: degree	Possible
	measurement		1: gon	
	units		2: mil	
			🕼 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
8	Angle resolution	0	0: high resolution	Possible
			1: low resolution	
			🕼 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
9	Vertical angle	0	0: Zenith 0°	Possible
	display		1: Horizontal 0°	
			2: Horizontal ±90°	
10	Vertical circle	0	0: Auto	Possible
	indexing		1: Manual	
11	Tilt angle	0	0: Yes	Possible
	compensation		1: No	
			2: Vertical angle only	
12	Horizontal circle	0	0: Auto	Possible
	indexing		1: Manual	
13	Coordinates	0	0: N-E-Z	Possible
	format		1: E-N-Z	
14		0	0 to 9: Reserved	Possible



Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

<Absolute encoder instruments>

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Indexing of the telescope is automatically performed when 0: Auto is selected in No. 10 Horizontal circle indexing for instruments with absolute encoders.

Only GT, DS-200i and MS05AX II /MS1AX II support Temperature and Pressure unit:5.

Related items

B, C, /C

Note [Prism constant display (range)]

Instrument type	/B	*/PG
GT	1mm (-99 to 99)	1mm (-99 to 99)
DS-200i		(When distance
		resolution is 0.1 mm or
		less: 0.1mm (-99.9 to
		99.9))
MS05AX/MS1AX	0.1mm (-99.9 to 99.9)	1mm (-99 to 99)
MS05AX II /MS1AX II		(When distance
MS1005		resolution is 0.1 mm or
		less: 0.1mm (-99.9 to
		99.9))

N.B.

1. Prism constant set to 0 (0.0) when reflectorless set as Reflector type.

Reflector type and prism constant settings can also be obtained using */PG. */PG allows setting of prism aperture and supports 360° Prism (ATP1). */PG is recommended for supporting instruments.

Angle display resolutions can also be set using /Dk. /Dk can also be used to set distance display resolutions. /Dk is recommended for supporting instruments.



7.2. /C - Reflector input

Send record

/C 0<cr><lf>

/C 0.sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	7		
	code			
2	Space	1 byte		
3	Reflector	0	0:Prism	
			1:Sheet	
			2:Reflectorless	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

B, /B, C, *PG, */PG

Reflector type and prism constant settings can also be obtained using */PG. */PG allows setting of prism aperture and supports 360° Prism */PG is recommended for supporting instruments.



7.3. /Da - Instrument station coordinates input

Send record

/Da 1234.567,-123.567,12.123<cr><lf>/Da 1234.567,-123.567,12.123,sum<cr><lf>/Da 1234.567,-123.567,12.123,sum<cr><lf>/Da 1234.567,-123.567,12.123,sum<cr><lf>/Da 1234.567,-123.567,12.123,sum<cr><ld>/Da 1234.567,-123.567,12.123,sum<cr></dd>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Da		
	code			
2	Space	1 byte		
3	Instrument	1234.567	☐ "3. CONVENTIONS USED IN THIS	
	station N/E		MANUAL"	
	coordinate			
4	Instrument	-123.567	☐ "3. CONVENTIONS USED IN THIS	
	station E/N		MANUAL"	
	coordinate			
5	Instrument	12.123	『 "3. CONVENTIONS USED IN THIS	Possible
	station Z		MANUAL"	
	coordinate			
			Left blank when <null></null>	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Instrument station Z coordinate.

Space is omitted for all other instrument types.

Related items

Da



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The order in which coordinates are input for No. 3 Instrument station N/E coordinate and No. 4 Instrument station E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



7.4. /Db - Distance and horizontal angle setting-out data input

Send record

/Db 64.960,45.3000<cr><lf>/Db 64.960,45.3000,sum<cr><lf>/Db 64.960,45.3000,sum<cr><lf>/Db 64.960,45.3000,sum<cr><ld>/Db 64.960,45.3000,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Db		
	code			
2	Space	1 byte		
3	Distance	64.960	☐ "3. CONVENTIONS USED IN THIS	Possible
	setting-out data		MANUAL"	
4	Horizontal angle	45.3000	☐ "3. CONVENTIONS USED IN THIS	Possible
	setting-out data		MANUAL"	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 setting-out distance data can be input in various modes: slope distance, horizontal distance height difference and REM distance. When receiving setting-out distance data using this command, the received distance data is set in every setting-out distance mode (except setting-out coordinate data).

Related items

Db, Ga, Gb, Gc, Gd, Gf



7.5. /Dc - Horizontal required angle input

Send record

/Dc 90.0000<cr><lf>/Dc 90.0000,sum<cr><lf>/Dc 90.0000,sum<cr><lf>/Dc 90.0000,sum<cr><lf>/Dc 90.0000,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dc		
	code			
2	Space	1 byte		
3	Required	90.0000	☐ "3. CONVENTIONS USED IN THIS	
	horizontal angle		MANUAL"	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

None



7.6. /Dd - Backsight station coordinates input

Send record

/Dd 1234.567,-123.567,1.520<cr><lf>/Dd 1234.567,-123.567,1.520,sum<cr><lf>/Dd 1234.567,-123.567,1.520,sum<cr><lf>/Dd 1234.567,-123.567,1.520,sum<cr><ld>/Dd 1234.567,-123.567,1.520,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dd		
	code			
2	Space	1 byte		
3	Backsight	1234.567	☐ "3. CONVENTIONS USED IN THIS	
	station N/E		MANUAL"	
	coordinate			
4	Backsight	-123.567	🖙 "3. CONVENTIONS USED IN THIS	
	station E/N		MANUAL"	
	coordinate			
5	Backsight	1.520	『 "3. CONVENTIONS USED IN THIS	Possible
	station Z		MANUAL"	
	coordinate		Left blank when <null>.</null>	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX ${\rm I\hspace{-.1em}I}$ /MS1AX ${\rm I\hspace{-.1em}I}$ and MS1005 support space input for No. 5 Instrument station Z coordinate.

Space is omitted for all other instrument types.

Related items

Dd, Xi



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No. 13 Coordinates format from the /B command.



7.7. /De - Instrument and target heights, temperature and pressure data input

Send record

/De 1.500,1.500,20,1015<cr><lf>/De 1.500,1.500,20,1015,sum<cr><lf>/De 1.500,1.500,20,1015,sum<cr><lf>/De 1.500,1.500,20,1015,sum<cr><lf>/De 1.500,1.500,20,1015

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/De		
	code			
2	Space	1 byte		
3	Instrument	1.500	☐ "3. CONVENTIONS USED IN THIS	Possible
	height		MANUAL"	
4	Target height	1.500	☐ "3. CONVENTIONS USED IN THIS	Possible
			MANUAL"	
5	Temperature	20	See table below	Possible
6	Pressure	1015	See table below	Possible

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

De, Di, /Di



Note [Temperature display (range)]

Instrument type	/De	/Di	
DS-200i	1°C (-30 to 60)	(Min. distance display = 1mm)	
MS1AX/MS1AX II	/1°F (-22 to 140)	1°C (-30 to 60)	
		/1°F (-22 to 140)	
		(Min. distance display =	
		0.1mm)	
		0.1°C (-30.0 to 60.0)	
		/0.1°F (-22.0 to 140.0)	
GT	1°C (-35 to 60)	(Min. distance display = 1mm)	
	/1°F (-31 to 140)	1°C (-35 to 60)	
		/1°F (-31 to 140)	
		(Min. distance display =	
		0.1mm)	
		0.1°C (-35.0 to 60.0)	
		/0.1°F (-31.0 to 140.0)	
MS05AX/ MS05AX II	1°C (-30 to 60)	0.1°C (-30.0 to 60.0)	
MS1005	/1°F (-22 to 140)	/0.1°F (-22.0 to 140.0)	

N.B.

- 1. Factory setting is °C
- 2. Unit can be switched between °C/°F using /B.

[Pressure display (range)]

Instrument type	/De	/Di
GT	1hPa (500 to 1400)/	(Min. distance display = 1mm)
DS-200i	1mmHg (375 to 1050)/	1hPa (500 to 1400)/
MS1AX/MS1AX II	0.1 inchHg (14.8 to 41.3)	1mmHg (375 to 1050)/
		0.1 inchHg (14.8 to 41.3)
		(Min. distance display =
		0.1mm)
		0.1hPa (500.0 to 1400.0)/
		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)
MS05AX/MS05AX II		0.1hPa (500.0 to 1400.0)/
MS1005		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)

N.B.

- 1. Factory setting is hPa
- 2. Unit can be switched between hPa/mmHg/inchHg using /B.

Note: Temperature and pressure values can also be obtained using /Di. Humidity can be input with /Di. /Di is recommended for supporting instruments.



7.8. /Df - Coordinates setting-out data input

Send record

/Df 1234.567,-12.345,9.182<cr><lf>/Df 1234.567,-12.345,9.182,sum<cr><lf>/Df 234.567,-12.345,9.182,sum<cr><lf>/Df 234.567,-12.345,9.182,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Df		
	code			
2	Space	1 byte		
3	Setting-out N/E	1234.567	☐ "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
4	Setting-out E/N	-12.345	☐ "3. CONVENTIONS USED IN THIS	
	coordinate		MANUAL"	
5	Setting-out Z	9.182	☐ "3. CONVENTIONS USED IN THIS	Possible
	coordinate		MANUAL"	
			Left blank when <null></null>	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005 support space input for No. 5 Setting-out Z coordinate.

Space is omitted for all other instrument types.

Related items

Df, Ge

 $\begin{tabular}{ll} \begin{tabular}{ll} \beg$

4 Setting-out E/N coordinate can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



7.9. /Dg - Coordinate data input to memory

Send record

/Dg 1234.567,-12.345,9.182,1000<cr><lf>

/Dg 1234.567,-12.345,9.182,1000,sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dg		
	code			
2	Space	1 byte		
3	N/E coordinate	1234.567	☐ "3. CONVENTIONS USED IN THIS	
	data		MANUAL"	
4	E/N coordinate	-12.345	『 "3. CONVENTIONS USED IN THIS	
	data		MANUAL"	
5	Z coordinate	9.182	☐ "3. CONVENTIONS USED IN THIS	Possible
	data		MANUAL"	
			Left blank when <null></null>	
6	Point number	1000	Range: 0 to 99999999	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX

Instrument type restrictions

Only MS05AX/MS1AX support space input for No. 5 Z coordinate.

Related items

None

Note: The order in which coordinates are input for No. 3 N/E coordinate data and No.

4 E/N coordinate data can be switched between N-E and E-N using field No. 13 Coordinates format from the /B command.



7.10. /Dh - Code Input to memory

Send record

/Dh ABC,DEF,GHIcr><If>/Dh ABC,DEF,GHI,sumcr><If>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dh		
	code			
2	Space	1 byte		
3	Code		Up to 16 alphanumeric characters in one	
		ABC,DEF,	code. Up to 40 codes can be input to memory.	
		GHI	Maximum length of code data is 256	
			alphanumeric characters in including	
			commas.	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX

Instrument type restrictions

None

Related items

None



7.11. /Di - Set atmospheric data

Send record

/Di 15, 1013, 50<cr><lf>/Di 15, 1013, 50, sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Di		
	code			
2	Space	1 byte		
3	Temperature	15	See table below	Possible
4	Pressure	1013	See table below	Possible
5	Humidity	50	Units: %	Possible
			See table below. Space is "50"	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

De, Di, /De



Note [Temperature display (range)]

Instrument type	/De	/Di
DS-200i	1°C (-30 to 60)	(Min. distance display = 1mm)
MS1AX/MS1AX II	/1°F (-22 to 140)	1°C (-30 to 60)
		/1°F (-22 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-30.0 to 60.0)
		/0.1°F (-22.0 to 140.0)
GT	1°C (-35 to 60)	(Min. distance display = 1mm)
	/1°F (-31 to 140)	1°C (-35 to 60)
		/1°F (-31 to 140)
		(Min. distance display =
		0.1mm)
		0.1°C (-35.0 to 60.0)
		/0.1°F (-31.0 to 140.0)
MS05AX/ MS05AX II	1°C (-30 to 60)	0.1°C (-30.0 to 60.0)
MS1005	/1°F (-22 to 140)	/0.1°F (-22.0 to 140.0)

N.B.

Unit can be switched between °C/° F using /B.

[Pressure display (range)]

Instrument type	/De	/Di
GT	1hPa (500 to 1400)/	(Min. distance display = 1mm)
DS-200i	1mmHg (375 to 1050)/	1hPa (500 to 1400)/
MS1AX/MS1AX II	0.1 inchHg (14.8 to 41.3)	1mmHg (375 to 1050)/
		0.1 inchHg (14.8 to 41.3)
		(Min. distance display =
		0.1mm)
		0.1hPa (500.0 to 1400.0)/
		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)
MS05AX/MS05AX II		0.1hPa (500.0 to 1400.0)/
MS1005		0.1mmHg (375.0 to 1050.0)/
		0.01 inchHg (14.77 to 41.33)

N.B.

- 1. Factory setting is hPa
- 2. Unit can be switched between hPa/mmHg/inchHg using /B.

Note [Humidity display (range)]

Instrument type	/De	/Di
GT	_	(Min. distance display = 1mm)
DS-200i		1 (0 to 100)
MS1AX/MS1AX II		(Min. distance display =
		0.1mm)
		0.1(0.0 to 100.0)
MS05AX/MS05AX II		0.1(0.0 to 100.0)
MS1005		



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Note: Temperature and pressure values can also be set using /De. /De is recommended for Instruments not supporting /Di.

7.12. /Dj – Collimation correction setting input

Send record

/Dj 0<cr><lf>

/Dj 0, sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dj		
	code			
2	Space	1 byte		
3	Collimation	0	0: Yes	
	correction		1: No	
	setting			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

Dj



7.13. /Dk – Distance and angle display resolution setting input

Send record

/Dk 0, 0<cr><lf>

/Dk 0, 0, sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dk		
	code			
2	Space	1 byte		
3	Minimum	0	0: High	Possible
	distance display		1: Low	
			2 to 9: Reserved	
			☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	
4	Minimum angle	0	0: High	Possible
	display		1: Low	
			2 to 9: Reserved	
			☐ "3. CONVENTIONS USED IN THIS	
			MANUAL"	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Dk



<u>Command Explanations – Total Station/Measuring Station Edition Chapter 7. INPUT COMMANDS</u> Page 132 of 238 Note: Angle display resolutions can also be set using /B. /B is recommended for instruments not supporting /Dk.



7.14. /DI – Error code/Detail code setting input

Send record

/DI 0,,,,<cr>

/DI 0,,,,,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/DI		
	code			
2	Space	1 byte		
3	Output error	0	0: Error code	Possible
	code		1: Detail code	
			2 to 9: Reserved	
4	Reserved		Omitted	Necessary
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary

Receive record

06H

Field

N	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

DI, Ea, *ST2, *SJ



7.15. /Dn - Adjustment of beep sound

Send record

/Dn 3,,,,<cr>

/Dn 3,,,,,sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Dn		
	code			
2	Space	1 byte		
3	Beep sound	3	DS-200i, MS05AX/MS1AX, MS1005	Possible
	volume		0: Off, 3: On	
			GT, MS05AX II /MS1AX II	
			0: Off	
			1: (small) to 5: (big)	
4	Reserved		Omitted	Necessary
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1114-x2-23 or later)

MS05AX II /MS1AX II

MS1005

Instrument type restrictions

Beep sound volume is fixed at 3 for the DS-200i and the MS05AX/MS1AX.

Related items

None



7.16. /Do - Adjustment of LCD backlight

Send record

/Do 1,5,0,,,,<cr>
/Do 1,5,0,,,,sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	/Do		
	code			
2	Space	1 byte		
3	Backlight	1	0: (dark) to 8: (bright)	Possible
	brightness			
	(at reticle			
	illumination on)			
4	Backlight	5	0: (dark) to 8: (bright)	Possible
	brightness			
	(at reticle			
	illumination off)			
5	Auto adjustment	0	0: Manual	Possible
	of backlight		1: Auto	
	brightness			
	(at reticle			
	illumination off)			
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary
9	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1.114_x2_23 or later) MS05AX $\rm I\!I$ /MS1AX $\rm I\!I$ MS1005



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Instrument type restrictions

None

Related items

None

In case auto adjustment of backlight brightness set "Auto", the backlight brightness(at reticle illumination off) is changed automatically regardless of the value which you set there.



7.17. /Ds - Distance, angle and tracking display resolution setting input

Send record

/Ds 0, 0,0,,,, <cr><lf>/Ds 0, 0, 0,,,,, sum<cr><lf>/Ds 0, 0, 0,,,,, sum<cr><lf>/Ds 0, 0, 0,,,,, sum<cr><lf>/Ds 0, 0, 0,,,,, sum<cr>/Ds 0, 0, 0,,,,,, sum<cr>/Ds 0, 0, 0,,,,,,, sum<cr>/Ds 0, 0, 0,,,,,, sum/Ds 0, 0, 0,,,,,, sum

Send field

No	Category	Example	Notes	Omit
1	Data	/Ds		
	identifying			
	code			
2	Space	1 byte		
3	Minimum	0	0: High	Possible
	distance		1: Low	
	display		2 to 9: Reserved	
			🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
4	Minimum angle	0	0: High	Possible
	display		1: Low	
			2 to 9: Reserved	
			🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
5	Minimum	0	0: High	Possible
	tracking		1: Low	
	display		🖙 "3. CONVENTIONS USED IN THIS	
			MANUAL"	
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary
9	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec

Instruments

GT



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Instrument type restrictions
None

Related items Ds



7.18. */KA - Prism check setting input

Send record

*/KA 0<cr><lf>

*/KA 0, sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/KA		
	code			
2	Space	1 byte		
3	Prism check	0	0: On	
	status		1: Off	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*KA

The prism check feature allows the user to check prism conditions for greater accuracy. When this option is set to "On", returned signal and ALC status are checked before distance measurement is performed. When set to "Off" these checks are not performed.



7.19. */PA - Motor parameter input

Send record (GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II)

*/PA 1,1,15.0000, 15.0000<cr><lf>

*/PA 1,1,15.0000, 15.0000, sum < cr > < lf >

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PA		
	code			
2	Space	1 byte		
3	Srch method	1	0: None	Possible
			1: G.S.	
			2: R.C.	
			3 to 9: Reserved	
4	Auto Tracking	1	0: Auto Pointing	Possible
	setting		1: Auto Tracking	
			2 to 9: Reserved	
5	Horizontal	15.0000	Units: degree/gon/mil	Possible
	search range		Range: 0.0000 to 360.0000/0.0000 to	
			400.0000/0.000 to 6400.000	
6	Vertical search	15.0000	Units: degree/gon/mil	Possible
	range		Range: 0.0000 to 90.0000/0.0000 to	
			100.0000/0.000 to 1600.00	

Note: [Srch method]

When set to "G.S.", the total station will search for the target in the area specified in 5: Horizontal search range and 6: Vertical search range. When set to "R.C.", the total station will wait for a Turning command to be issued from the RC-Controller before starting Auto Pointing. Such commands can only be received when using instruments incorporating RC handle.

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.



Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

MS05AX/MS1AX

The horizontal and vertical search ranges are as follows. Angle values can be specified in 1° 30' steps.

H search range: 1° 30' to 360° 00' V search range: 1° 30' to 360° 00'

The Auto Tracking item in "Auto Tracking setting" is only applicable to the MS05AX/MS1AX Auto Tracking models.

GT, DS-200i, MS05AX II /MS1AX II

The horizontal and vertical search ranges are as follows. Angle values can be specified in 1° / 1gon / 1mil steps.

H search range: 0° to 360° V search range: 0° to 360°

The Search method item is fixed to "0: None" to the GT, DS-200i and the MS05AX II /MS1AX II which has neither auto tracking nor auto pointing function.

The option "1: Auto Tracking" of the Auto Tracking setting item is available only to GT, DS-200i and the MS05AX II /MS1AX II which has tracking function.

MS1005

Operation unaffected by this setting.

Related items

*PA



Auto Pointing and Auto Tracking are added to distance measurement depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



7.20. */PD - Motor drive positioning accuracy setting input

Send record

*/PD 10<cr><lf>

*/PD 10,sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PD		
	code			
2	Space	1 byte		
3	Positioning	10	3" to 60"	
	accuracy			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

Positioning accuracy settings are 5", 10", 20", 30", or 60" for the DS-200i and MS05AX/MS1AX.

Positioning accuracy settings are 3", 5", 10", 20", 30", or 60" for the GT, MS05AX II /MS1AX II .

Related items

*PD, *DHA, *DHI, *DHF

Note: This command cannot be used with Motor Drive Total Station series when the 2-way commands setting is selected.



7.21. */PF - Light function setting input

Send record

*/PF 1,1<cr><lf>

*/PF 1,1,sum<cr><lf>

Send field (GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II, MS1005)

No	Category	Example	Notes	Omit
1	Data identifying	*/PF		
	code			
2	Space	1 byte		
3	Light type	1	1: Guide light/LED	Possible
			2: Laser-pointer	
			5: LED&Laser-pointer	
			6 to 9:Reserved	
3	Brightness	1	1: Dim	Possible
			2: Normal	
			3: Bright	
			4 to 9:Reserved	
			Brightness is "1" when "Laser-pointer" is set	
			in Light type.	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 5 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

DS-200i do not support Light type: 1.

5: LED&Laser-pointer in No.3 Light type is only available for the MS05AX II /MS1AX II .

Related items

*PF, *GLON, *GLOFF



7.22. */PG - Reflector switching setting input

Send record

*/PG 0,-30,70 <cr><lf>
*/PG 0,-30,70,sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying code	*/PG		
2	Space	1 byte		
3	Reflector	1	0: Prism 1: Sheet 2: Reflectorless 3: 360° Prism 4: SMR 5 to 99; Reserved	Possible
4	Prism constant	-30	See table below Always "0" for Reflectorless	Possible
5	Prism aperture	70	Units: mm Range: 0mm to 999mm Always "0" for Reflectorless	Possible

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

*PG, B, /B, C, /C



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Note [Prism constant display (range)]

Instrument type	/B	*/PG
GT	1mm (-99 to 99)	1mm (-99 to 99)
DS-200i		(When distance
		resolution is 0.1
		mm or less:
		0.1mm (-99.9 to
		99.9))
MS05AX/MS1AX	0.1mm (-99.9 to	1mm (-99 to 99)
MS05AX II /MS1AX II	99.9)	(When distance
MS1005		resolution is 0.1
		mm or less:
		0.1mm (-99.9 to
		99.9))

N.B.

Prism constant set to 0 (0.0) when reflectorless set as Reflector type.

Reflector type and prism constant settings can also be obtained using /C and /B respectively. /C and /B are recommended for instruments not supporting */PG.



7.23. */PH - Set sighting accuracy

Send record

*/PH 0<cr><lf>

*/PH 0, sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PH		
	code			
2	Space	1 byte		
3	Sighting	0	0: Fine	
	accuracy		1: Rapid	
			2 to 9: Reserved	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*PH, *SJ, *SJ2, *PI, */PI



7.24. */PI – Auto Pointing setting input

Send record

*/PI 0, 0, , , , , , <cr><lf>
*/PI 0, 0, , , , , , sum<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PI		
	code			
2	Space	1 byte		
3	Sighting	0	0: Fine	
	accuracy		1: Rapid	Possible
4	Centering mode	0	0: Standard Centering same as normal Auto	Possible
			Pointing	
			1: Advanced Centering always finishes from	
			fixed position	
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary
9	Reserved		Omitted	Necessary
10	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Data identifying	06H		
	code			

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

Even though ACK is received when the Centering mode item is set to "1: Advanced Centering always finishes from fixed position" with the GT and DS-200i, the actual setting remains to "0: Standard Centering same as normal Auto Pointing".



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Related items *PI, *PH, */PH

7.25. */PJ – Resume function setting input

Send record

*/PJ 0,,,,<cr>

*/PJ 0,,,,,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PJ		
	code			
2	Space	1 byte		
3	Resume	0	0: On	Possible
	function		1: Off	
4	Reserved		Omitted	Necessary
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary

Receive record

06H

Field

١	VО	Category	Example	Notes	Omit
1		Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*PON, *POFF, *PJ



7.26. */PL - Silent mode - rotation speed setting

Send record

*/PL 0,0,,,,,[,sum]<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PL		
	code			
2	Space	1 byte		
3	Vertical rotation	0	0: normal	
	speed		1: 2°/sec	
			2: 4°/ sec	
			3: 8°/ sec	
			4: 16°/ sec	
			5: 32°/ sec	
4	Horizontal	0	0: normal	
	rotation speed		1: 2°/sec	
			2: 4°/ sec	
			3: 8°/ sec	
			4: 16°/ sec	
			5: 32°/ sec	
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary
9	Reserved		Omitted	Necessary
10	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX/MS1AX (Ver.1114-x2-25 or later) MS05AX II /MS1AX II

Instrument type restrictions

None



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Related items *PL



7.27. */PM - Auto Pointing limit range setting

Send record

*/PM 3.000,3.000,,,,[,sum]<cr><lf>

Send Field

No	Category	Example	Notes	Omit
1	Data identifying	*/PM		
	code			
2	Space	1 byte		
3	Auto Pointing	3.000	0.001 to 13.000 (Unit: m)	
	horizontal limit			
	range			
	(distance)			
4	Auto Pointing	3.000	0.001 to 13.000 (Unit: m)	
	vertical limit			
	range			
	(distance)			
5	Reserved		Omitted	Necessary
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

PA、/PA、*PM

Note: See the note in "6.52.".



7.28. */PQ - Advanced tracking setting

Send record

*/PQ 2,2,,,,[,sum]<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*/PQ		
	code			
2	Space	1 byte		
3	Forecast time	0	0: 0.5 sec	
			1: 1 sec	
			2: 2 sec	
			3: 3 sec	
			4: 4 sec	
			5: 5 sec	
			9: Auto	
			6 to 8: Reserved	
4	Wait time	0	0 to 3,600 sec	
			9999: No limit	
			3601 to 9998: Reserved (Unit: m)	
5	Advanced		0: Standard	
	tracking		1: Fixed averaging	
			2 to 9: Reserved	
6	Reserved		Omitted	Necessary
7	Reserved		Omitted	Necessary
8	Reserved		Omitted	Necessary

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

Instrument type restrictions

None



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Related items *PQ



8. SETTING COMMANDS

Command transmit and data output

When the setting command "N" is transmitted from the host computer to the total station, the total station transmits the reception condition code to the host computer. (ACK/NAK communication control)

- 1. 06H (ACK): Data communication has succeeded, requests sending the next command.
- 2. 15H (NAK): Data communication has failed, requests sending the same command again.

For flow diagram see " Command transmit and data output" in "7 Input Commands".

Instrument display

Entered values are displayed in the display units selected on the instrument.

On those instruments for which "inch" can be selected, distance value must be input in "feet".



8.1. Xa - Set Distance measurement mode to Fine "s"

Send record

Xa<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xa		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Xb, Xc, Xd, Xe



8.2. Xb - Set Distance measurement mode to Fine "r"

Send record

Xb<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xb		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Xa, Xc, Xd, Xe



8.3. Xc - Set Distance measurement mode to Rapid "s"

Send record

Xc<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xc		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

Xa, Xb, Xd, Xe



8.4. Xd - Set Distance measurement mode to Rapid "r"

Send record

Xd<cr>

Send field

Ν	Category	Example	Notes	Omit
	Data identifying	Xd		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Xa, Xb, Xc, Xe



8.5. Xe - Set Distance measurement mode to Tracking

Send record

Xe<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xe		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

Xa, Xb, Xc, Xd

Note: Distance measurement in Tracking mode is faster than in Rapid (repeat) mode. Display resolutions are also lower.



8.6. Xf - Return to measurement mode top screen

Send record

Xf<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xf		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

No distinction made between Measurement mode top screen and angle measurement mode. When this command is received the instrument enters measurement mode.

% and Xg also result in the instrument entering measurement mode.

Related items

%, Xg



8.7. % - Return to measurement mode top screen

Send record

%

Send field

No	Category	Example	Notes	Omit
1	Data identifying	%		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

Stops Gd command.

No distinction made between Measurement mode top screen and angle measurement mode. When this command is received the instrument enters measurement mode.

When Xf or Xg are received, Gd is not stopped but the instrument enters measurement mode.

Related items

Xf, Xg



8.8. Xg - Return to measurement mode top screen

Send record

Xg<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xg		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

No distinction made between Measurement mode top screen and angle measurement mode. When this command is received the instrument enters measurement mode.

Xf and % also result in the instrument entering measurement mode.

Related items

Xf, %



8.9. Xh - Set H angle to 0

Send record

Xh<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xh		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

/Dc



8.10. Xi - Set Azimuth angle from backsight and Instrument station coordinates

Send record

Xi<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xi		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

Da, Dd, /Da, /Dd



8.11. Xk - Set H angle right (HAR)

Send record

Xk<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xk		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

XI



8.12. XI - Set H angle left (HAL)

Send record

XI<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	XI		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

Xk



8.13. Xn - Replace the last measured coordinates as the new Instrument station coordinates (instrument station movement)

Send record

Xn<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xn		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

None



8.14. Xo - Change the starting position in missing line measurement

Send record

Xo<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xo		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

The Eg command can only be used in missing line measurement.

Related items

Eg



8.15. Xr - Turn on the display illumination

Send record

Xr<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xr		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

Xs



8.16. Xs - Turn off the display illumination

Send record

Xs<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xs		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

None

Related items

Xr



8.17. Xz - Set distance measurement mode to Road

Send record

Xz<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	Xz		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

Instrument type restrictions

None

Related items

Xa, Xb, Xc, Xd, Xe

Note: 'Road' can be selected only when 'Reflectorless' is selected as 'Reflector'.



8.18. *GLON - Turn the guide light/LED/laser-pointer ON

Send record

*GLON<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*GLON		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

This command can also be used with GT, DS-200i, MS05AX/MS1AX, MS05AX ${\rm II}$ /MS1AX ${\rm II}$ to turn the laser-pointer on.

DS-200i does not support Guidelight.

Related items

*PF, */PF, *GLON0, *GLON1, *GLOFF

With the MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005, LED set to "Lit" with *GLON0, and "Blink" with *GLON1.



8.19. *GLON0 - Set guide light/LED/laser-pointer to "Lit"

Send record

*GLON0<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*GLON0		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/ MS1AX, MS 05AX $\rm II$ / MS 1AX $\rm II$ and MS1005 support laser-pointer.

Related items

*PF, */PF, *GLON, *GLON1, *GLOFF

With the MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005, LED/Laser-pointer set to "Lit" with *GLON0, and "Blink" with *GLON1.



8.20. *GLON1 - Set guide light/LED/laser-pointer to "Blink"

Send record

*GLON1<cr>

Send field

I	9	Category	Example	Notes	Omit
	1	Data identifying	*GLON1		
		code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/ MS1AX, MS05AX $\rm II$ / MS1AX $\rm II$ and MS1005 support laser-pointer.

Laser-pointer on GT/DS-200i is lit when selected.

DS-200i does not support Guidelight.

Related items

*PF, */PF, *GLON, *GLON0, *GLOFF

With the MS05AX/MS1AX and MS05AX II /MS1AX II LED/Laser-pointer set to "Lit" with *GLON0, and "Blink" with *GLON1.



8.21. *GLOFF - Turn the guide light/LED/laser-pointer off

Send record

*GLOFF<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*GLOFF		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

MS1005

Instrument type restrictions

Only GT, DS-200i, MS05AX/ MS1AX, MS05AX $\rm I\!I/MS1AX\,I\!I$ and MS1005 support laser-pointer.

DS-200i does not support Guidelight.

Related items

*PF, */PF, *GLON, *GLON0, *GLON1

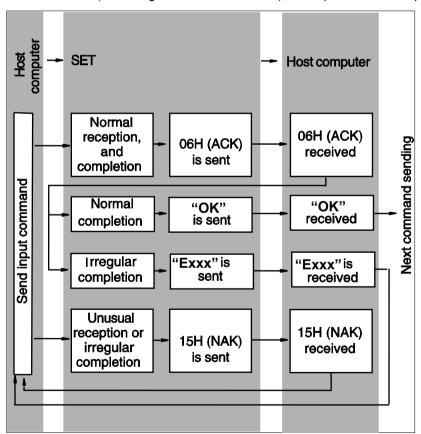


9. OPERATING COMMANDS

- Operating commands on MTS (Motor Drive Total Station series) including the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II can only be used when commands are set to "Remote".
- Command transmit and data output

When an operating command is transmitted from the host computer to the surveying instrument, the surveying instrument transmits the reception condition code to the host computer. (ACK/NAK communication control)

- 1. 06H (ACK): Data communication has succeeded.
- 2. 15H (NAK): Data communication has failed, requests sending the same command.
- Under normal operating conditions, when operating commands are received, the surveying instrument moves according to the command. And when movement is completed, surveying instrument sends a completion status code to the computer.
 - 1. OK CR LF: The operation is completed, requests sending the next command.
 - 2. E### CR LF (###:3 digit numeric error code): The operation is completed irregularly.





Angle field format

Angle fields (horizontal angle and vertical angle) are output as 7 digits with no decimal point. When the number of digits is insufficient, a digit is added as shown below.

9.1. *PON - Power on

Send record

*PON<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*PON		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 2 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command transmission is 120 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

 $\mathsf{MS05AX} \: \mathbb{I} \: / \mathsf{MS1AX} \: \mathbb{I}$

Instrument type restrictions

None

Related items

*POFF



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Note: MS05AX/MS1AX

*PON<cr> must be sent within 0.5 to 1 seconds of <cr>> transmission. Retry several times until 06H is received.

When RS232C is set as the total station communication mode, communication settings are as below and cannot be changed.

Baud rate: 9600
Data bits: 8
Parity: Not set
Stop bit: 1

MS05AX/MS1AX

When *Bluetooth* is set as the total station communication mode, the *PON command can only be used when the instrument has been turned off using the *POFF command.

When RS232C is set as the total station communication mode and the Resume function has been canceled due to the total station being stored with the battery removed etc., reception of OK<cr><lf> will take approximately 15 seconds.

DS-200i, MS05AX II /MS1AX II

Send *PON<cr> at the interval of 0.2 sec. repeatedly until receiving 06H. When the Resume function has been canceled due to the total station being stored with the battery removed etc., reception of OK<cr><lf> will take approximately 60 seconds.

GΤ

Send *PON<cr> at the interval of 1 sec. repeatedly until receiving 06H. When the Resume function has been canceled due to the total station being stored with the battery removed etc., reception of OK<cr><lf> will take approximately 60 seconds.



9.2. *POFF -Power off

Send record

*POFF<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*POFF		
	code			

Receive record

06H

Field

Ν	Category	Example	Notes	Omit
	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command transmission is 5 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

 $\mathsf{MS05AX} \: \mathbb{I} \: / \mathsf{MS1AX} \: \mathbb{I}$

Instrument type restrictions

None

Related items

*PON



9.3. *DHA - Rotate total station to the specified angle

Send record

*DHA3595959VA0895959<cr>

*DHA3595959VA0895959,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*DHA		
	code			
2	Specified	3595959	௴"9. OPERATING COMMANDS"	
	horizontal angle			
3	Data identifying	VA		
	code			
4	Specified	0895959	© "9. OPERATING COMMANDS"	
	vertical angle			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion is 20 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II



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Instrument type restrictions

None

Related items

*R, *DHF, *DHI

Note: Direction of rotation cannot be specified. The instrument will rotate toward the shortest distance from the target position.



9.4. *DHF - Face1/Face 2 rotation

Send record

*DHF<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*DHF		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

Exxx<cr><lf>

Time for command transmission is 20 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

*R, *DHA, *DHI



9.5 *DHG - Face1/Face2 rotation (from the current position)

Send record

*DHG 0,,,,[,sum]<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*DHG		
	code			
2	Space	1 byte		
3	Face1/face2	0	0: face1 to face2 *1	
	rotation method		1: face2 to face1 *1	
			2: face1 to face2 *2	
			3: face2 to face1 *2	
			*: compulsory face1/face2 rotation *1	
			@: compulsory face1/face2 rotation *2	
4	Reserved		Always null	
5	Reserved		Always null	
6	Reserved		Always null	
7	Reserved		Always null	

^{*1:} Follow the main unit setting

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

Exxx<cr><lf>

Time for command transmission is 20 sec.



^{*2:} Accuracy 2'

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Instruments

GT

DS-200i

MS05AX II /MS1AX II

Instrument type restrictions None

Related items None



9.6. *DHI - Turning total station specified angle

Send record

*DHI-0882314VI-1274432<cr>

*DHI-0882314VI-1274432,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*DHI		
	code			
2	Specified	+0882314	© "9. OPERATING COMMANDS"	
	horizontal angle			
3	Data identifying	VI		
	code			
4	Specified	-1274432	© "9. OPERATING COMMANDS"	
	vertical angle			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion is 20 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II



Instrument type restrictions None

Related items *R, *DHA, *DHF



9.7. *SJ - Automatic target sighting

When not using in conjunction with the Remotocatcher/ Remote Control system

Send record

*SJ000000<cr>

*SJ000000,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying code	*SJ		
2		000	Input 000	
3		000	Always 000	

When using in conjunction with the Remotocatcher/Remote Control system

Send record

*SJ101000<cr>

*SJ101000,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*SJ		
	code			
2	Auto	101	000 Auto Pointing (G.S.)	
	Pointing/Turning		001 Clockwise Turning	
			100 Counterclockwise Turning	
			101 Turning toward the shortest distance the	
			RC Controller	
			010 Continuous Turning	
3		000	Always 000	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>



Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion depends on Search Area.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

No.2 is only available for the insruments MS05AX ${\rm II}$ /NET1AX ${\rm II}$ combined with Remote Control system.

Related items

*R, *Q, *SJ2, *PH, *PI, */PH, */PI

Time for command completion will vary according to Search Area settings when performing Auto Pointing (G.S.).

Auto Pointing speed with *SJ2 is slightly faster than *SJ. Use *SJ2 when the distance to the target is known in advance such as when performing periodic monitoring. Otherwise, *SJ is recommended.

Auto Tracking is added to Auto Pointing depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



9.8. *SJ2 - Auto Pointing at designated distace

Send record

*SJ2 123<cr>

*SJ2 123, sum<cr>

Send field (when not using in conjunction with the Remote Control system)

No	Category	Example	Notes	Omit
1	Data identifying	*SJ2		
	code			
2	Space	1byte		
3	Distance to the	123	Unit: m	
	target		Range: 1 to 99999 (round down)	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion depends on Search Area.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II

Instrument type restrictions

None



Related items

*SJ, *PH, *Q, *PI, */PH, */PI

Note:

Take care when inputting distance values. Input values are in meters. Auto Pointing will still be performed even if the input value is incorrect but accurate results will not be obtained. No error is displayed to indicate incorrect input.

Auto Pointing can be performed using *SJ2 when the distance to the target is known in advance such as when performing periodic monitoring. Auto Pointing is slightly faster with *SJ2.

Auto Tracking is added to Auto Pointing depending on instrument settings for those instruments incorporating Auto Pointing/Auto Tracking functionality. Refer to "10. Instrument Settings and Trigger Operation".



9.9. *SJ3 - Auto Pointing by designated search method

Send field

*SJ3 0,1,100,,,,,<cr>

*SJ3 0,1,100,,,,,sum<cr>

Field

No	Category	Example	Notes	Omit
1	Data identifying code	*SJ3		
2	Space	1byte		
3	Searcg method	0	0: Grobal search 1: Operated by RC-controller (auto) *3 2: Operated by RC-controller (clockwise turning) *3 3: Operated by RC-controller (counterclockwise turning) *3 4: Operated by RC-controller (re-search a target other than presently sighted target) 5: Operated by RC-controller (only turning operation) 6∼9: Reserved	Possible
4	Auto tracking	1	0: Only search 1: Search and auto tracking 2∼9: Reserved	Possible
5	Distance value *1	100	Input distance value from the target Unit: fixed at "m" Input range: 1 to 99999m *2	Possible
6	Reserved		Always null	
7	Reserved		Always null	
8	Reserved	_	Always null	
9	Reserved		Always null	
10	Reserved		Always null	

^{*1} No.5 Distance value is only applicable when No.3 Search method is "0: Grobal search".

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		



^{*2} Less than 1m is rounded down.

^{*3} Perform described actions when any target is not found in the field of view.

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Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	1 Control code OK <cr><lf></lf></cr>			

Error

E###<cr><lf>

Time for command completion depends on Search Area.

Instruments

GT

DS-200i

MS05AX II /MS1AX II

Instrument type restrictions

No.3 and No.6 are only available for GT, DS-200i and MS05AX $\rm II\!I/MS1AX\,II$ combined with Remote Control system.

Related items

*SJ, *SJ2, *PA, */PA, PH, */PH

Note: Input the distance value to speed up the grobal search slightly when the distance to the target is already known during periodic monitoring etc.

Even if a wrong distance value is input, search may be carried out without an error. In that case, the search may not be accurate.

Be sure the input unit is "m". Input the correct distance value.



9.10. *J - Fixed velocity rotation

Send record

*JH-11V+13<cr>

*JH-11V+13,sum<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*J		
	code			
2		Н	Always H	
3	Horizontal	-11	+: Clockwise turning	
	direction velocity		-: Counterclockwise turning	
			DS-200i, MS05AX II /MS1AX II	
			speed range: -16 to +16	
			+00: Suspend	
			GT	
			speed range: -18 to +18	
			+00: Suspend	
4		٧	Always V	
5	Vertical direction	+13	+: zenith to face1 direction	
	velocity		-: zenith to face2 direction	
			DS-200i, MS05AX II /MS1AX II	
			speed range: -16 to +16	
			+00: Suspend	
			GT	
			speed range: -18 to +18	
			+00: Suspend	

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Instruments

GΤ

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II



Instrument type restrictions
None

Related items

*R

Note: [Suspend rotation]

To suspend horizontal and vertical roration, send code *JH+00V+00<cr> or *R.



9.11. *JG - Fixed velocity rotation in designated velocity

Send record

*JG +3600,-2400,,,,<cr>

*JG +3600,-2400,,,,,sum<cr>

Send Field

No	Category	Example	Notes	Omit
1	Data identifying code	*JG		
2	Space	1byte		
3	Horizontal direction velocity	3600	MS05AX/MS1AX Range -29400 to +29400 (+00: Suspend) (Unit: about 9.26 ["/sec])	
			MS 05AX II / MS 1AX II Range -31100 to +31100 (+00: Suspend) (Unit: about 9.26 ["/sec])	
			GT Range -69980 to +69980 (+00: Suspend) (Unit: about 9.26 ["/sec])	
			DS-200i Range -27900 to +27900 (+00: Suspend) (Unit: about 9.03 ["/sec]) +: Clockwise turning -: Counterclockwise turning	
4	Vertical direction velocity	-2400	MS05AX/MS1AX Range -29400 to +29400 (+00: Suspend) (Unit: about 9.26 ["/sec]) MS 05AX II / MS 1AX II Range -31100 to +31100 (+00: Suspend)	
			(Unit: about 9.26 ["/sec]) GT Range -69980 to +69980 (+00: Suspend) (Unit: about 9.26 ["/sec])	
			DS-200i Range -27900 to +27900 (+00: Suspend) (Unit: about 9.03 ["/sec]) +: From zenith to face1 -: From zenith to face2	
5	Speed-up		0: Normal 1: High speed	Possible
6	Reserved		Always null	
7	Reserved		Always null	
8	Reserved		Always null	



Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX (Ver.1114-x2-21 or later)

MS05AX II /MS1AX II

Instrument type restrictions

No.5 is only available for the GT and DS-200i.

Related items

*R, *Q

Note: [Suspend the rotation]

To suspend horizontal and vertical roration, send code *JG 0,0,,,,<cr> or *R.



9.12. *Q - Measurement/motor drive stop request

Send record

*Q<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*Q		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 10 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

12H, Ea, *ST1, *ST2, *ST0, *DHA, *DHF, *DHI, *SJ, *SJ2, *TBON, *J, *R, *TILT

Note: Stops distance measurement, motor drive operations (e.g. specified angle rotation, search, fixed velocity rotation), Auto Tracking, and continuous data output.



9.13. *R - Rotation stop request

Send record

*R<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*R		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command transmission is 5 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX MS05AX II /MS1AX II MS1005

Instrument type restrictions

None

Related items

*DHA, *DHF, *DHI, *SJ, *SJ2, *TBON, *TILT, *J, *Q, *Z

Note: This command will also stop Auto Tracking when in progress.



9.14. *Z - Horizontal and vertical circle indexing

Send record

*Z<cr>

Send field

No	Category	Example	Notes	Omit
•	Data identifying	*Z		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion is 20 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

Resetting the vertical and horizontal indexing is not necessary for the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II . When a command is received, no operation is performed and a response is sent immediately.

Related items

*R



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Note: Vertical and horizontal indexing are automatically reset. If reset is already completed, a normal completion message is received. When "Manual" is set for resetting the vertical index, an error message is received.

9.15. *TBON - Auto Tracking start request

Send record

*TBON<cr>

Send field

Ν	lo	Category	Example	Notes	Omit
	1	Data identifying	*TBON		
		code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion depends on Search Area.

Instruments

GT Auto Tracking model

DS-200i

MS05AX/MS1AX Auto Tracking model MS05AX II /MS1AX II Auto Tracking model

Instrument type restrictions

None

Related items

*TBSP, *R



9.16. *TBSP - Auto Tracking stop request

Send record

*TBSP<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*TBSP		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Instruments

GT Auto Tracking model

DS-200i

MS05AX/MS1AX Auto Tracking model MS05AX II /MS1AX II Auto Tracking model

Instrument type restrictions

None

Related items

*TBON, *R

Note: Search/Turning before Auto Tracking is not stopped.

Auto Tracking stopped using *R.



9.17. *TILT - Tilt offset

Send record

*TILT<cr>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*TILT		
	code			

Receive record

06H

Field

No	Category	Example	Notes	Omit
1	Control code	06H		

Error

NAK (15H)

Time for command reception is 5 sec.

Completion status receive record

OK<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Control code	OK <cr><lf></lf></cr>		

Error

E###<cr><lf>

Time for command completion is 90 sec.

Instruments

GT

DS-200i

MS05AX/MS1AX

MS05AX II /MS1AX II

Instrument type restrictions

None

Related items

None



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Note: Once this command has been received, tilt offset is performed according to the sequence shown below. Reception of OK<cr>><lf> will take approximately 60 seconds.

[Tilt offset flow]

Standby mode \rightarrow tilt data acquisition \rightarrow 180° horizontal rotation \rightarrow standby mode \rightarrow tilt data acquisition \rightarrow tilt offset values writing \rightarrow 180° horizontal rotation \rightarrow OK<cr><lf>



10. INSTRUMENT SETTINGS AND TRIGGER OPERATION

• Trigger key operation

Trigger key operations are those operations such as Auto Pointing and Auto Tracking added to existing operations depending on instrument settings.

	Operation	Command
GT	Distance measurement	11h, Ea, *ST2 etc.
DS-200i	Auto Pointing	*SJ000000
MS05AX/MS1AX	Turning	*SJ101000
MS05AX II	Auto Tracking start	*TBON
/MS1AX II	-	

The Turning operation locates the Remotocatcher/Remote Control system RC-Controller by detecting the laser beam output by the RC-Controller, after which Auto Pointing starts.

• Trigger key operations by instrument setting

GT, DS-200i, MS05AX/MS1AX, MS05AX II /MS1AX II

Srch method: None

	A.T. Setting		
	Search	Track (Auto Tracking models only)	
Distance measurement	Distance measurement only		
Auto Pointing	Auto Pointing only		
Turning	Turning operation only		

Srch method: Global Search (G.S.)

	A.T. Setting		
	Search	Track (Auto Tracking models only)	
Distance	G.S.→Distance measurement	G.S.→Distance measurement and	
measurement		Auto Tracking	
Auto Pointing	G.S. only	G.S.→Auto Tracking	
Turning	Turning operation only	Turning operation→Auto Tracking	
Auto Tracking start	G.S.→Auto Tracking		

Srch method: R.C.

	A.T. \$	Setting
	Search	Track (Auto Tracking models only)
Distance	Turning operation.→Distance	Turning operation → Distance
measurement	measurement	measurement and Auto Tracking
Auto Pointing	G.S.only	G.S.→Auto Tracking
Turning	Turning operation only	Turning operation→Auto Tracking
Auto Tracking start	Turning operation→Auto Tracking	



11. COMMANDS AVAILABLE ACCORDING TO INSTRUMENT STATUS WHEN "2-WAY" SET

O: Available x: Not available

Available ×: Not available				
Command	Meas.	Distance		
	mode	measurement		
		in progress		
00H	0	×		
11H	0	0		
12H	0	0		
13H	0	×		
14H	0	0		
Α	0	×		
В	0	×		
С	0	×		
Da	0	×		
Db	0	×		
Dd	0	×		
De	0	×		
Df		×		
Di	0	×		
Dj	0	×		
Dk	0	×		
DI	0	×		
Dm	0	×		
Dn	0	×		
Do	0	×		
Dp	0	×		
DS	0	×		
Ea	0	0		
Eb	0	×		
Ec	0	×		
Ed	0	×		
Ee	0	×		
Ef	0	×		
Eg	0	×		
Eh	0	×		
Ei	0	×		
Ej	0	×		
Ek	0	×		
Ga	0	×		
Gb	0	×		
Gc	0	×		
Gd	0	×		
Ge	0	×		
Gf	0	×		
*ST1	0	×		
*ST2	0	×		
<u> </u>		1		



*ST3	0	×
*ST0		0
*PF	0	×
*PG	0	×
*0	0	×
*ST0 *PF *PG *Q /B /C	0	×
/C	0	×
/Da	0	×
/Db	0	×
/Dc	0	×
/Db /Dc /Dd /De /Df /Dg /Dh /Di /Dj /Dk	0	×
/De	0	×
/Df	0	×
/Da	0	×
/Dh	0	×
/Di	0	×
/Di	0	×
/Dk	0	×
/DI	0	×
/Dn	0	×
/Do	0	×
/Ds	0	×
*/PF	0	×
/Dn /Do /Ds */PF */PG Xa Xb Xc Xd Xe Xf	0	×
Xa	0	×
Xh	0	×
Xc	0	×
Xd	0	×
Xe	0	×
Xf	0	×
%	0	×
Xg		×
Xh	0	×
Xi	0	×
Xk	0	×
XI	0 0 0 0 0 0	×
Xn	0	×
Xo	0	×
Xr	0	×
Xs	0	×
Xz	0	×
*GLON	0	×
*GLON0	0	×
*GLON1	0	×
*GLOFF	0	×
02011	<u> </u>	



12. DATA OUTPUT FROM THE SURVEYING INSTRUMENT

This function starts measurement (angle/distance) and outputs the value to the connected equipment on the spot by key operation of the total station.

- On those instruments for which "inch" can be selected, distance value is output in "feet". (Slope distance and angle data request)
- Operation of data output differs on some instruments. See relevant operator's manual.
- Checksum data

To calculate the checksum, add every 8-bit of data from the start of the data to the space (20H), including commas (2CH), before the checksum. The checksum is the last two significant digits of the total represented as 2 bytes of ASCII code.

Checksum output example: A SET2C,123456,4100,2506,39<cr><lf>Calculation example: $41+20+53+45+54+32+43+2C+\ldots+2C=539H$ For a checksum 39 output, 33H, 39H in ASCII code is output.



12.1. Angle measurement

In Measurement mode, sight the target, press **[HVOUT-S]**. The instrument measures the angle and outputs the data in the format shown in the example below.

For key allocation, see the relevant operator's manual.

Output format example

Output record

0000000 0895942 1243159 <cr><lf>0000000 0895942 1243159 sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Slope distance	0000000	© "5. STANDARD COMMANDS"	
2	Space	1 byte		
3	Vertical angle	0895942	© "5. STANDARD COMMANDS"	
4	Space	1 byte		
5	Horizontal angle	1243159	© "5. STANDARD COMMANDS"	
6	Space	1 byte		



12.2. Distance measurement

In Measurement mode, sight the target, press **[HVOUT-S]**. The instrument For key allocation, see the relevant operator's manual.

Output format example

Output record

0456789 0895942 1243159 <cr><lf>0456789 0895942 1243159 sum<cr><lf>

Field

No	Category	Example	Notes	Omit
1	Slope distance	0456789	© "5. STANDARD COMMANDS"	
2	Space	1 byte		
3	Vertical angle	0895942	௴ "5. STANDARD COMMANDS"	
4	Space	1 byte		
5	Horizontal angle	1243159	☐ "5. STANDARD COMMANDS"	
6	Space	1 byte		



13. REMOTE CONTROLLER TRIGGER KEY OPERATION

The following is output to the data collector when the trigger key on the handle of Remote Controller is pressed.

13.1. *RCA - Normal press

Send record

*RCA<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*RCA		
	code			

13.2. *RCB - Press and hold

Send record

*RCB<cr><lf>

Send field

No	Category	Example	Notes	Omit
1	Data identifying	*RCB		
	code			



14. ERROR CODES

The following is a list of the error codes. Error codes are output to the specified field when an error occurs during a measurement. If the same error code is repeated or if any message not shown below appears, contact your local dealer.

Error codes	Detail codes*1	Messages on total station	Meaning
E114 E115 E116 E117		Out of range	The tilt of the instrument exceeds the tilt angle compensation range during measurement. Level the instrument again.
E200	E209	Out of range	Exceeds distance measurement range. Shorten the distance between the instrument and the target, then measure again.
E200	E210	Signal off	The reflected light is not observed, has weakened or is blocked during measurement. Either sight the target again, or, when using a reflective prism, increase the number of reflective prisms.
E200	E211	Signal off	Unsuitable measurement conditions when reflectorless measurement is set. When reflectorless measurement is set, distance cannot be measured because the laser beam is striking at least two surfaces at the same time. Choose a single surface target for distance measurement.
E200	E212 E214	Bad condition	Measurement conditions are poor. Either sight the target again, or when using a reflective prism, increase the number of reflective prisms.
E200	E215	Temp Rnge OUT	The instrument is outside useable temperature range and accurate measurement cannot be performed. Repeat measurement within the appropriate temperature range.
E200	E216	Battery low	Battery level temporarily declines. Replace the battery and perform measurement again.

^{*1:} The user can select either error code or detail code using the /DI command.



If an error occurs during measurement, motor drive operation or Auto Pointing, an error message appears in the corresponding field.

Error	Messages on instrument	Meaning
code/Detail		
code	0: 1 #	
E560 ^{*2}	Signal off	The reflected light is not observed, has weakened or is blocked during measurement. Either sight the target again, or, when using a reflective prism, increase the number of reflective prisms. If the same error message is repeated using with the same prism, you should wipe the prism and try again.
E562 ^{*2} E564 ^{*2}	Bad condition	Measurement conditions are poor. Either sight the target again, or when using a reflective prism, increase the number of reflective prisms. If the same error message is repeated using with the same prism, you should wipe the prism and try again.
E565 ^{*2}	Temp Rnge OUT	The instrument is outside useable temperature range and accurate measurement cannot be performed. Repeat measurement within the appropriate temperature range.
E571	Stopped	An object obstructs the telescope during motor drive operation and the motor drive stops.
E572	Time out	Search of a specified angle/auto pointing is not
E579		carried out in the fixed time.
E573	Tilt out of range	The tilt of the instrument exceeds the tilt angle compensation range after the specified angle of rotation is completed. Level the instrument again.
E575	Target not found	The target is searched for but cannot be found.
E575 E578 ^{*1}	Light detected too strong!!	Sighting has been canceled due to sunlight or extremely strong light entering the telescope along the sighting direction. Avoid such light when performing measurement.
E576	Bad condition	Distance measurement conditions are poor. Check the prism is set correctly and perform measurement again.



E577	When the telescope turns to zenith/nadir, it is not possible to search!!	The instrument cannot perform a search during Auto Pointing or Auto Tracking when the telescope is directed to the zenith or nadir angle. Set the telescope position within the measuring range and perform the operation again.*3
E591	Remotocatcher Communication err !! Remote Control communication err !!	Communication between the total station and RC-Controller has failed. Check the status (communications setup, power supply, cable connections etc.) of the RC-Controller, wireless modem and cables.

^{*1:} E578 output for MS05AX/MS1AX.

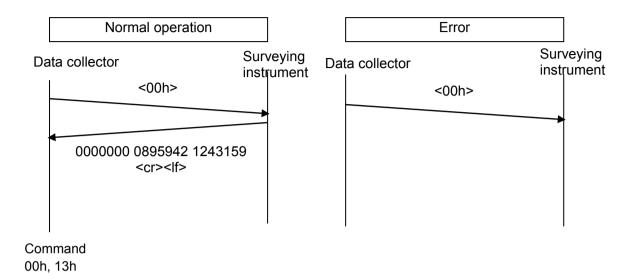


^{*2:} E560, E562, E564 and E565 output for MS05AX/MS1AX (Ver.1114-x2-28 or later) and MS05AX II /MS1AX II .

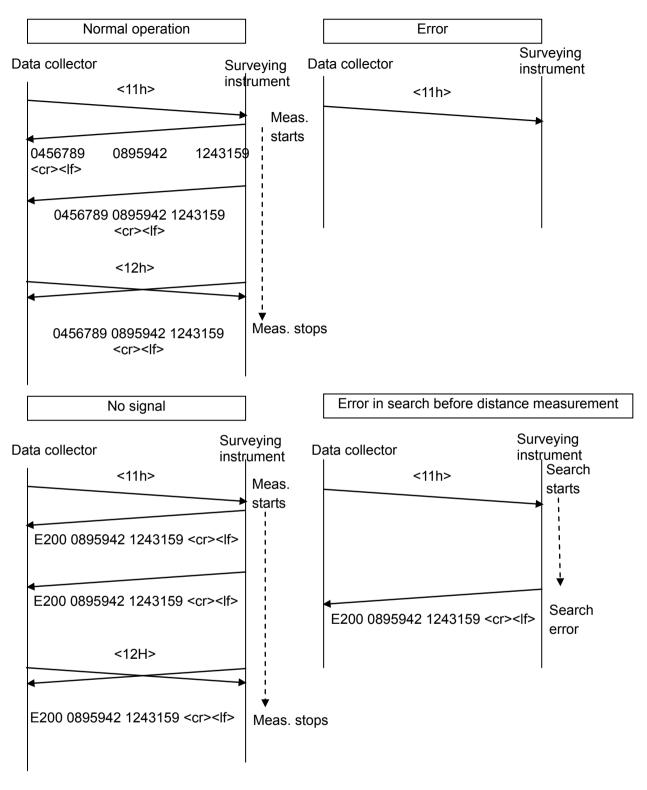
^{*3:} There are instruments which can perform a search when the telescope is directed to the zenith.

15. COMMUNICATION TYPE

15.1. Basic (angle measurement) command



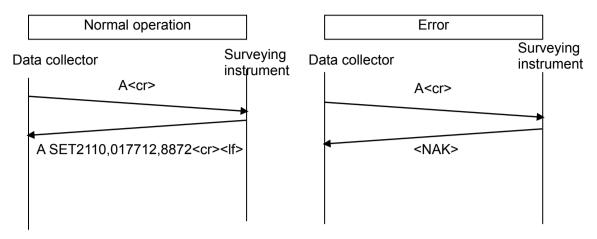
15.2. Basic (continuous distance measurement) command



Command 11H, 14H, (Stop measurement) 12H



15.3. Data output (single) command

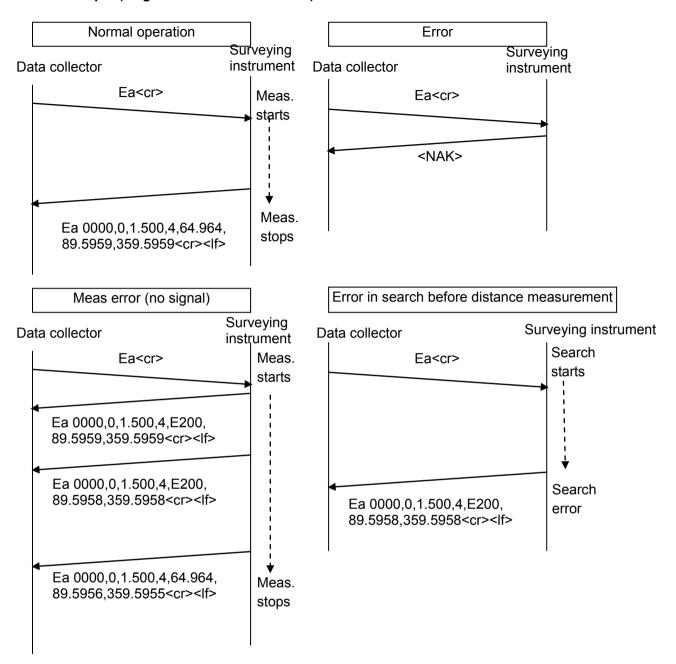


Command

A, B, C, Da, Db, Dd, De, Df, Di, Dj, Dk, Dl, Dm, Dn, Do, Dp, Ds, Ee, Eh, Ej, Ek, *KA, *PA, *PD, *PF, *PG, *PH, *PI, *PJ, *PH, *PM, *PQ



15.4. Data output (single distance measurement) command



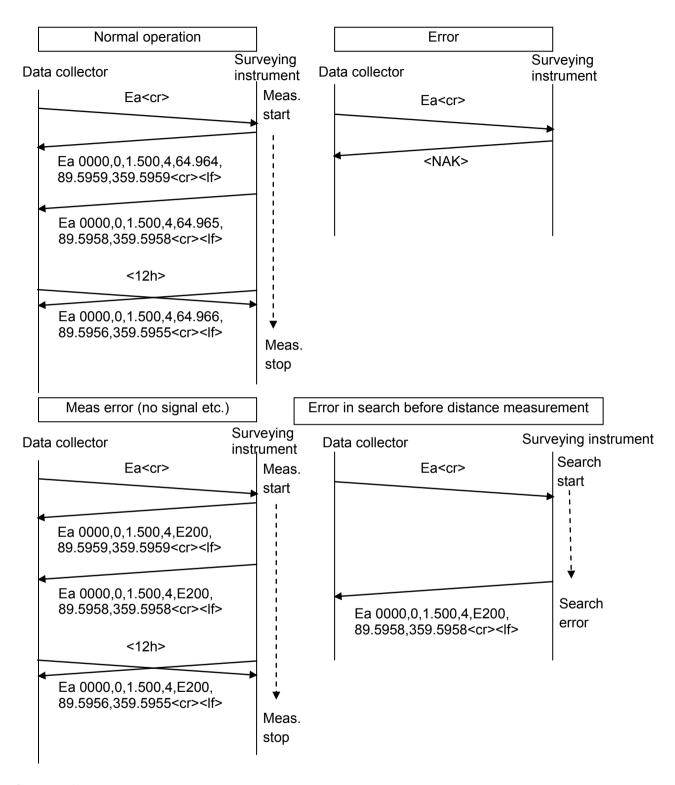
Command

(Single distance measurement)

Ea, Eb, Ec, Ed, Eg, Ei, Ga, Gb, Gc, Ge, *ST2, *ST3, *ST4, *ST5, *ST6



15.5. Data output (repeat distance measurement) command



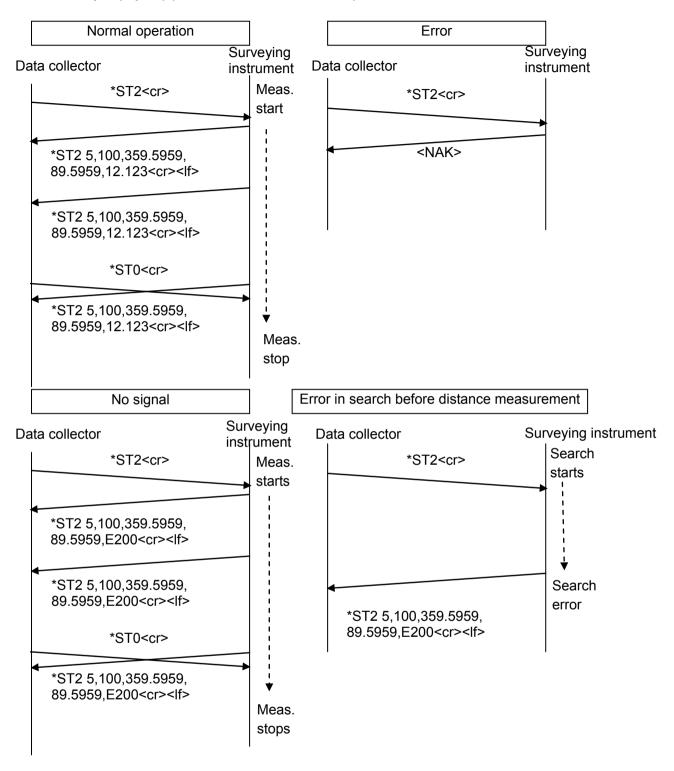
Command

Ef、Gd、Gf

(Repeat distance measurement) Ea、Eb、Ec、Ed、Eg、Ei、Ga、Gb、Gc、Ge (Stop measurement) 12h



15.6. Data output (repeat) (*ST0, *ST1, *ST2, *ST3, *ST4) command

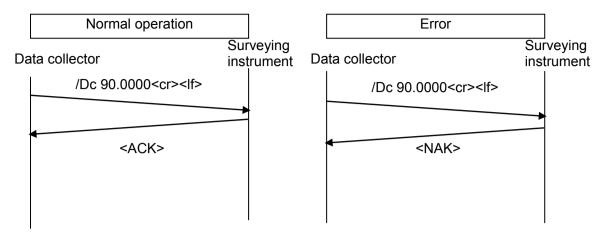


Command *ST1 (Pennet distance manufacturement) *ST2

(Repeat distance measurement) *ST2、*ST3, *ST4 (Stop measurement) *ST0 (Only R/L data) *ST9



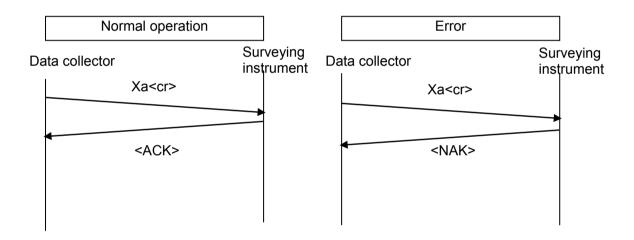
15.7. Data input command



Command

/B, /C, /Da, /Db, /Dc, /Dd, /De, /Df, /Dg, /Dh, /Di, /Dj, /Dk, /Dl. /Dn, /Do, /Ds, */KA, */PA, */PD, */PF, */PG, */PH, */PJ, */PJ, */PM, */PQ

15.8 Setting command

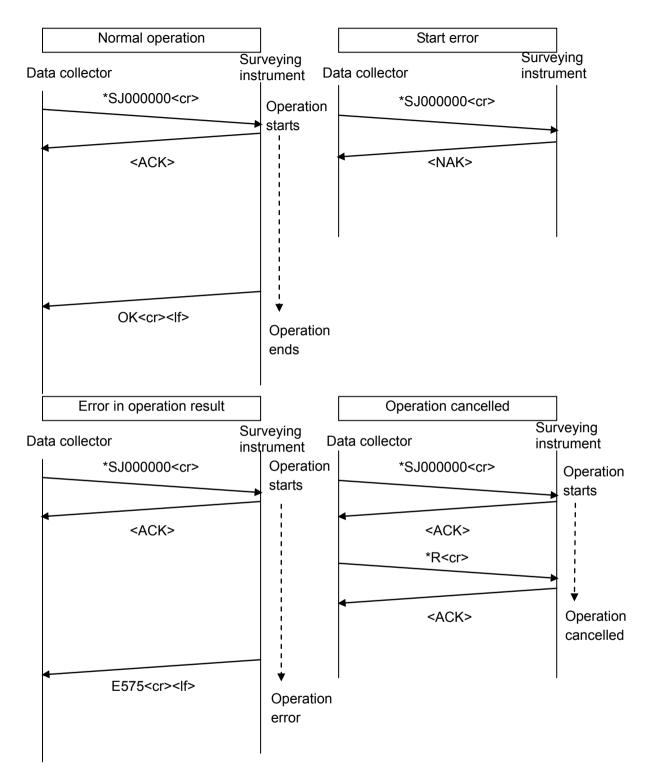


Command

Xa, Xb, Xc, Xd, Xe, Xf, %, Xg, Xh, Xi, Xk, Xl, Xn, Xo, Xp, Xq, Xr, Xs, Xt, Xz, *GLON, *GLON1, *GLOFF



15.9. Operating command



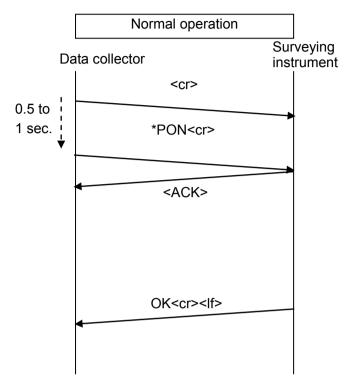
Command

*DHA, *DHF, *DHI, *DHG, *SJ, *SJ2, *SJ3, *Z, *TILT, (Stop operation) *R

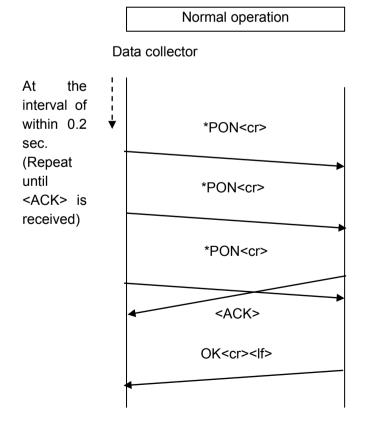


15.10. Power on command

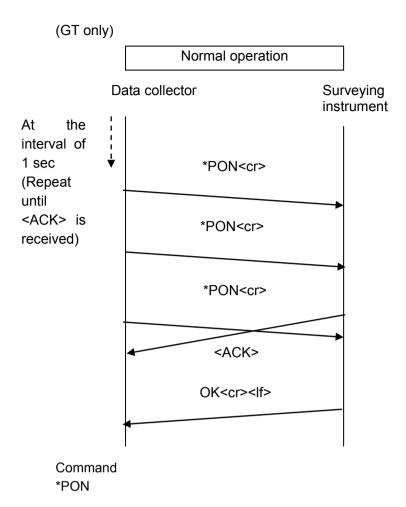
(MS05AX/MS1AX only)



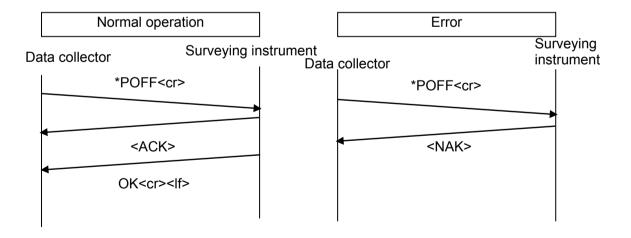
(DS-200i, MS05AX II /MS1AX II only)







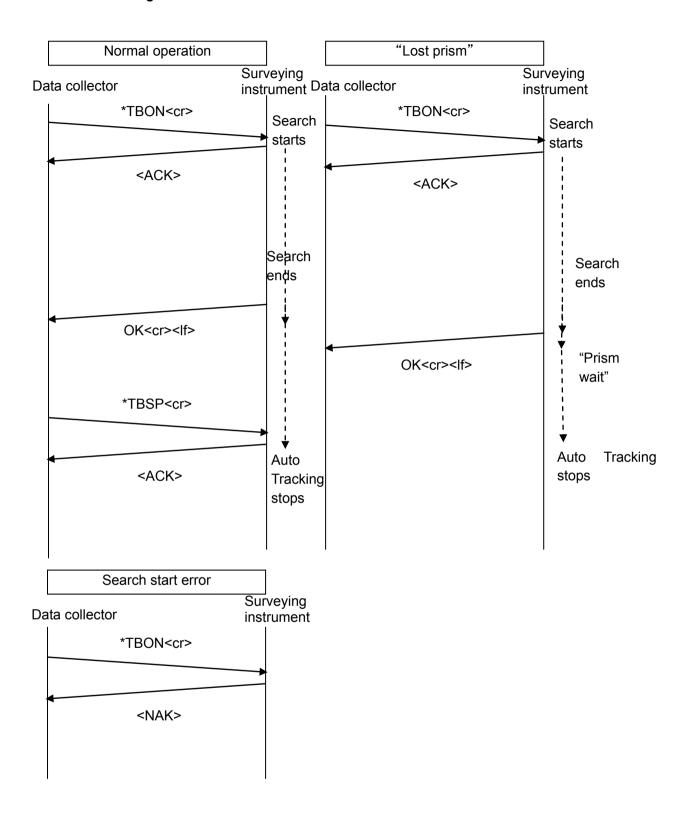
15.11. Power off command

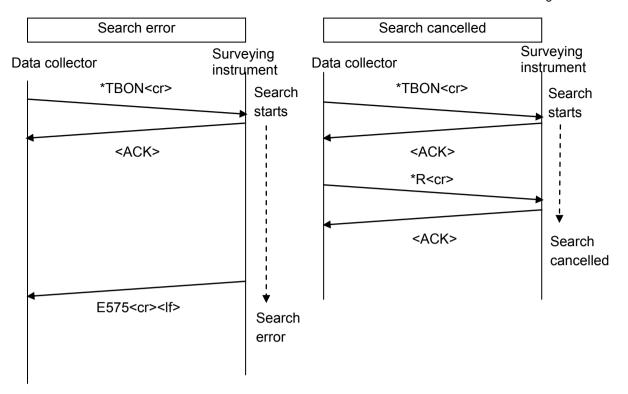


Command *POFF



15.12. Auto Tracking command

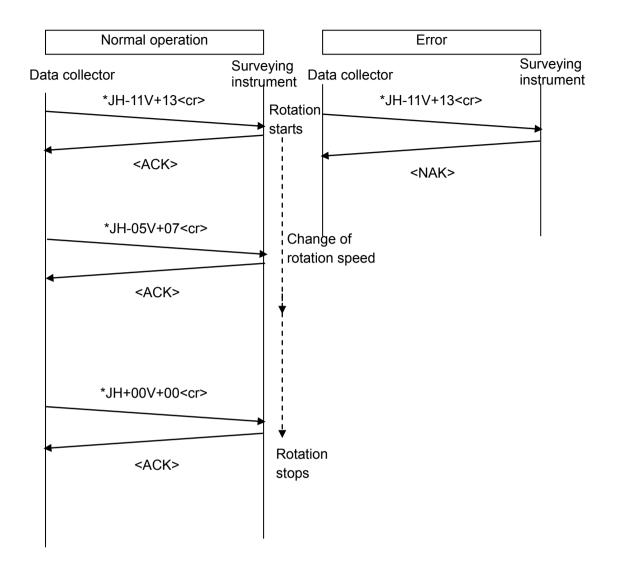




Command *TBON (Stop Auto Tracking) *TBSP (Stop search) *R



15.13. Fixed velocity rotation command



Command *J, *JG



16. APPENDICES

16.1. Communication setup list

	GT
	DS-200i
Baud rate	1200/
(bps)	2400/
	4800/
	9600/
	19200/
	38400
Data bits	8/7
Parity	Not set/
	Odd/Even
Stop bit	1/2
Checksum	Yes/No
Controller	Remote/
	2-way/All*1

*1: MTS (Motor Drive Total Station series), which includes the GT, DS-200i can be used to set command operations (motor drive commands). Select "Remote" to use command operations. (However, some of the 2-way commands cannot be used.) To use all 2-way commands for total stations, select "2-way". For details of commands that can be used when "Remote" is selected, see "16.3 Commands that can be used when Remote is set".

-	1
	MS05AX/MS1AX
	MS 05AX II
	MS 1AX II
Baud rate (bps)	1200/
	2400/
	4800/
	9600/
	19200/
	38400
Data bits	8/7
Parity	Not set/ Odd/Even
Stop bit	1/2
Checksum	Yes/No
Controller	Remote/
	2-way/All*1

Mote: *1: MTS (Motor Drive Total Station series), which includes the MS05AX/MS1AX and MS05AX II /MS1AX II can be used to set command operations (motor drive commands). Select "Remote" to use command operations. (However, some of the 2-way commands cannot be used.) To use all 2-way commands for the MS, select "2-way". For details of commands that can be used when "Remote" is selected, see "14.3 Commands that can be used when Remote is set".



16.2. List of 2-way commands by product

<Total Station>

< Total Station	GT
	DS-200i
Α	0
В	0
A B C Da	0
Da	0
Db	0
Dd	0
De	0
Df	0
Df Di	0
Dj	0
Dk	0
DI	0
Dm	
Dn	0
Do	0
Ds	O*1
Ea	0
Eb	0
Ec	0
Ed	0
Ee	0 0 0 0 0 0
Ee Ef	0
Eg	0
Fh	0
Eh Ei Ej	0
Fi	0
Ga	0 0
Gb	0
Gc	
Gd	0
Ge	0
	0
Gf *ST1	0
*ST2	0
*ST2 *ST3	
*ST0	0
*ST0 *PF *PG *Q	0
*PG	0
*0	0
/B	0
/C	0
/Da	0
/Da	

	GT DS-200i
/Db	
/Dc	0
/Dd	0
/De	0
/Df	0
/Da	×
/Dh	×
/Db /Dc /Dd /De /Df /Dg /Dh	0 0 0 0 0 0 x x x 0 0 0 0
/Dj	0
/Dk	0
/DI	0
/Dj /Dk /Dl /Dn	0
/Do /Ds */PF */PG	0
/Ds	O*1
*/PF	0
*/PG	0
Xa	0
Xb	O*1 O O O O O O O O O O O O O O O O O O
Xc Xd	0
Xd	0
Xe Xf, % , Xg	0
Xf, % , Xg	0
Xh	0
Xi	0
Xk	0
XI	0
Xn	0
Xo	0
Xr, Xs	0
Xt	×
Xz	O*1
*GLON	0
*GLON0	0
*GLON1	0
*GLOFF	0

^{*1:} This command is only available for the GT.

<MS>

>	ı
	MS05AX/MS1AX
	MS05AX II
	/MS1AX II
	MS1005
Α	0
В	0
С	0
Da	0
Db	0
Dd	0
De	0
Df	0
Di	0
Dj	0
Dk	0
DI	O O O O O O O O O O O O O O O O O O O
	0
Dm	O*1
Dn	O*1
Do	O*2
Dp	U
Ea	0
Eb	0
Ec	0
Ed	0 0 0 0 0 0 0
Ee	0
Ef	0
Eg	0
Eh	0
Ei	0
Ej	0
Ek	O*1
Ga	0
Gb	0
Gc	0
Gd	0
Ge	0
Gf	
*ST1	0
*ST2	0
*ST3	0
*ST0	
*PG	0
*Q	0
/B	O
/C	O
/Da	0
/Db	0



	MS05AX/MS1AX
	MS05AX/MSTAX
	/MS1AX II
	MS1005
/Dc	
/Dd	0 0 0
	0
/De	0
/Df	O*3
/Dg	U
/Dh	0,
/Di	0
/Dj	0
/Dk	0
/DI	O O O O O O O O O O O O O O O O O O O
/Dn	O
/Do	O^1
*/PF	0
*/PG	0
Xa	O ^{*1} O O O O O O O O O O O O O O O O O O O
Xb	0
Xc	0
Xd	0
Xe	0
Xf, % , Xg	0
Xh	0
Xi	0
Xk	0
XI	0
Xn	O*2
Xo	O*2
Xr, Xs	0
Xt	×
*GLON	0
*GLON1	0
*GLON0	0
*GLOFF	0

^{*1:} This command is only available for MS05AX/MS1AX, MS05AX II /MS1AX II and MS1005.



^{*2:} This command is only available for MS05AX II /MS1AX II and MS1005.

^{*3:} This command is not available for MS05AX II /MS1AX II and MS1005.

16.3. List of Commands that can be used when Remote is set

Remote mode allows communication between the surveying instrument and RC-Rx handle when turning the instrument ON/OFF and performing Turning. When the surveying instrument, RC-Rx handle and data collector are all connected (surveying instrument<>RC-Rx handle <> data collector) commands for the RC-Rx handle are not received by the data collector. However, when the surveying instrument and data collector are connected (surveying instrument<>data collector), commands for the RC-Rx handle are received by the data collector when turning the instrument ON/OFF. Ignore such commands received by the data collector. Format for RC-Rx handle commands is as follows:

!_<command strings><cr><lf>

(_ signifies a space)

The following commands on MTS (Motor Drive Total Station series), which includes the GT, DS-200i, MS05AX/MS1AX and MS05AX II /MS1AX II can be used when commands are set to "Remote".

Status	Standby	Auto	Auto	Data output	Data output	Motor drive	Dist.
	status	Tracking in	Tracking	using *ST1	using *ST2	status	measure-
		progress	Prism Wait				ment using
Command							11H/Ea
00H	0	0	0	×	×	×	×
Ee	0	0	0	×	×	×	×
11H	0	0	0	×	×	×	0
Di	0	0	0	×	×	×	×
Dk	0	0	0	×	×	×	×
DI	0	0	0	×	×	×	×
Dm	0	0	0	×	×	×	×
Ea	0	0	0	×	×	×	0
Eh	0	0	0	×	×	×	×
Ei	0	0	0	×	×	×	×
Ej	0	0	0	×	×	×	×
12H	0	0	0	×	×	×	0
*J	0	×	×	0	0	×	0
*JG	0	×	×	0	0	×	0
*KA	0	0	0	×	×	×	×
*ST1	0	0	0	0	0	×	×
*ST2	0	0	0	0	0	×	×
*ST3	0	0	0	0	0	×	×
*ST4	0	0	0	0	×	×	×
*ST5	0	0	0	0	×	×	×
*ST6	0	0	0	0	×	×	×
*ST9	0	0	0	0	×	×	×
*ST0	0	0	0	0	0	×	×
*TBON	0	0	0	0	×	×	×
*TBSP	0	0	0	0	×	×	×
*GLON	0	0	0	0	×	×	×
*GLON0	0	0	0	0	×	×	×



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<u> </u>	T	1	T	T	<u> </u>		age 236 of 238
Status	Standby	Auto	Auto	_	Data output		Dist.
	status	Tracking in	Tracking	using *ST1	using *ST2	status	measure-
		progress	Prism Wait				ment using
Command							11H/Ea
*GLON1	0	0	0	0	×	×	×
*GLOFF	0	0	0	0	×	×	×
*TILT	0	0	0	0	×	×	×
*Q	0	0	0	0	0	0	0
*R	0	0	0	0	×	0	×
*SJ	0	0	0	0	×	×	×
*SJ2	0	0	0	0	×	×	×
*SJ3	0	0	0	0	×	×	×
*DHA	0	0	0	0	×	×	×
*DHF	0	0	0	0	×	×	×
*DHG	0	0	0	0	×	×	×
*DHI	0	0	0	0	×	×	×
*Z	0	0	0	×	×	×	×
*PA	0	0	0	×	×	×	×
*PD	0	0	0	×	×	×	×
*PF	0	0	0	×	×	×	×
*PG	0	0	0	×	×	×	×
*PH	0	0	0	×	×	×	×
*PI	0	0	0	×	×	×	×
*PJ	0	0	0	×	×	×	×
*PL	0	0	0	×	×	×	×
*PM	0	0	0	×	×	×	×
*PQ	0	0	0	×	×	×	×
Α	0	0	0	×	×	×	×
В	0	0	0	×	×	×	×
С	0	0	0	×	×	×	×
De	0	0	0	×	×	×	×
/B	0	0	0	×	×	×	×
/C	0	0	0	×	×	×	×
/Dc	0	0	0	×	×	×	×
/De	0	0	0	×	×	×	×
/Dk	0	0	0	×	×	×	×
/DI	0	0	0	×	×	×	×
/Di	0	0	0	×	×	×	×
Dn	0	0	0	×	×	×	×
/Dn	0	0	0	×	×	×	×
Do	0	0	0	×	×	×	×
/Do	0	0	0	×	×	×	×
Ds	0	0	0	×	×	×	×
/Ds	0	0	0	×	×	×	×
*PON	-	-	-	-	-	_	_
*/KA	0	0	0	×	×	×	×
*POFF	0	0	0	0	0	0	0
*/PA	0	0	0	×	×	×	×
/r. / \		1	1	1 ^	1 ^	1 ^	1 ^



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							aye 237 01 230
Status	Standby	Auto	Auto	Data output	Data output	Motor drive	Dist.
	status	Tracking in	Tracking	using *ST1	using *ST2	status	measure-
		progress	Prism Wait				ment using
Command							11H/Ea
*/PD	0	0	0	×	×	×	×
*/PF	0	0	0	×	×	×	×
*/PG	0	0	0	×	×	×	×
*/PH	0	0	0	×	×	×	×
*/PI	0	0	0	×	×	×	×
*/PJ	0	0	0	×	×	×	×
*/PL	0	0	0	×	×	×	×
*/PM	0	0	0	×	×	×	×
*/PQ	0	0	0	×	×	×	×
Xa	0	0	0	×	×	×	×
Xb	0	0	0	×	×	×	×
Xc	0	0	0	×	×	×	×
Xd	0	0	0	×	×	×	×
Xe	0	0	0	×	×	×	×
Xh	0	0	0	×	×	×	×
Xk	0	0	0	×	×	×	×
XI	0	0	0	×	×	×	×
Xf	0	0	0	×	×	×	×
Xg	0	0	0	×	×	×	×
Xz	0	0	0	×	×	×	×
%	0	0	0	×	×	×	×

17. REVISION RECORDS

Revision dates	Edition	Contents
September 2015	1509(2B)	Add MS1005
	1607 (3C)	Add GT series. Add commands (Ds, /Ds, *PQ, */PQ, Xz) Change command names (Dk, /Dk) Add error codes (E209, E216)



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