Confidential

Do not reproduce or redistribute without the express permission of KONICA MINOLTA, INC.

Spectrophotometer CM-700d/CM-600d Communication Specifications



Konica Minolta, Inc. Optics Company, Sensing Business Unit. 3-91, Daisennishimachi, Sakai-ku, Sakai-shi, Osaka, JAPAN http://www.konicaminolta.com/selector/instruments.html

© 2009-2013 KONICA MINOLTA, INC.

Notes regarding these specifications:

- An understanding of the fundamentals of PC communication is assumed in the preparation of this document. This document was prepared to explain communication procedures specific to the stated product.
- Reprinting or reproduction in any form of this document or the information contained herein in its entirety or in part without the express permission of Konica Minolta, Inc. is strictly prohibited.
- The information herein is subject to change without notice.
- Although every effort has been made to ensure the accuracy of the information contained herein, if you discover an error, missing information, etc. please notify your Konica Minolta representative.
- Konica Minolta is not responsible in any way for any losses, damage, etc. resulting from the use of the information contained herein.
- Company names and product names contained herein are trademarks or registered trademarks of their respective companies.

Revision (Date)	Modifications		
Rev. 1.23 (February 4, 2008)	Original English revision		
Rev. 1.32 (May 9, 2009)	To correspond to ROM Ver. 1.10		
	 Additional response parameters for STR command. 		
	 Additional error message for data protection (Commands: TDS, TTD, TTS, TDD, TAD) 		
Rev. 1.33 (July 19, 2013)	To correspond to ROM Ver. 1.20		
	 Addition of COR and RCR commands 		

Table of Contents

1		Communication Specifications	5
	1.1	Communication method	5
	1	.1.1 USB	5
	1	.1.2 Bluetooth	6
	1.2		
	1.3		
	1.4	Format for sent/received character string	
	1.5	Timeout setting	
	1.6	Storage of settings and data	
	1.7		
_		3	0
2		Product commands	
	2.1	Command table	
	2.2		
	2	.2.1 Instrument / Status	
		IDR (Identification Read)	
		STR (Status Read)	
	2	.2.2 Condition settings	
		CPR (Condition Parameter Read)	
		CPS (Condition Parameter Set)	16
		CRR (Colorimetric Parameter Read)	
		CRS (Colorimetric Parameter Set)	19
		ECR (Environment Condition Parameter Read)	
		ECS (Environment Condition Parameter Set)	
		ENR (Environment Number Read)	
		ENS (Environment Number Set)	
		EIS (Environment Identification Set)	
	2	.2.3 Calibration settings	
	_	CIR (White Calibration Plate Identification Read)	
		CIS (White Calibration Plate Identification Set)	
		CDR (White Calibration Data Read)	
		CDS (White Calibration Data Set)	
		UCR (User Calibration Data Read)	
		UCS (User Calibration Data Set)	
		USR (User Calibration Status Read)	
		USS (User Calibration Status Set)	
	2	.2.4 Calibration Operations	
		ZRC (Zero Calibration)	
		CAL (White Calibration)	
		USC (User Calibration)	
	2	.2.5 Measurement Operations	
		MES (Measurement)	
		MDR (Measurement Data Read)	
		COR ("Color Data Read")	
		SWS (Measuring Switch Status Set)	
		RDR (Remote Measurement Data Read)	46
		RCR ("Trigger Measurement Color Data Read")	48
	2	.2.6 Measurement values	
		SPR (Sample Data Parameter Read)	50
		SDR (Sample Data Read)	
		SDD (Sample Data Delete)	
		SAD (Sample Data All Delete)	54
	2	2.7 Target color	55

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

TNR (Target Number Read)	55
TNS (Target Number Set)	
TPR (Target Data Parameter Read)	57
TDR (Target Data Read)	
TDS (Target Data Set)	
TTD (Use Target Tolerance Default Values)	63
TTR (Target Tolerance Values Read)	64
TTS (Target Tolerance Values Set)	67
TDD (Target Data Delete)	71
TAD (Target Data All Delete)	72
TOR (Default Tolerance Values Read)	73
TOS (Default Tolerance Values Set)	
TOD (Default Tolerance Values Delete)	
TIR (Default Tolerance Identification Read)	81
TIS (Default Tolerance Identification Set)	82
2.2.8 Settings; Other items	83
APR (Auto Print Status Read)	83
APS (Auto Print Status Set)	84
DFR (Date Format Read)	85
DFS (Date Format Set)	86
DPR (Data Property Read)	
DPS (Data Property Set)	
DTR (Date and Time Read)	
DTS (Date and Time Set)	
LAR (Language Read)	
LAS (Language Set)	
LPR (Low Power Attribute Read)	
LPS (Low Power Attribute Set)	
OVR (Overwrite Message Status Read)	
OVS (Overwrite Message Status Set)	
DSP (Display String Register)	
DSC (Display String Clear)	
DSF (Display Refresh)	
ATR (Auto Target Status Read)	
ATS (Auto Target Status Set)	
Error-check codes	
Character table	
ppendix A: Measurement flow	
Measurement controlled by PC	105
Measurement controlled by instrument measuring button	105
ppendix B: Communication command flow	
B.1 From startup to measurement (Results read as spectral data)	106
B.2 From startup to measurement (Results read as colorimetric data)	
B.3 Setting white calibration data	
B.4 Taking measurements using measuring button in communication mode	101
	100
(Results read as spectral data)	108
B.5 Taking measurements using measuring button in communication mode	400
(Results read as colorimetric data)	
K 6 Performing user calibration and taking measurement	100

3 4

1 Communication Specifications

1.1 Communication method

Communication with the instrument can be performed using either USB or Bluetooth. Specifications for communication via each method are described below.

1.1.1 USB

USB communication is performed according to a CDC class that can use a Windows standard device driver. Therefore, communication with a PC can be performed with the instrument configured as using a COM port. The specifications of USB communication are stated below. For baud rate, communication can be performed regardless of the setting (default is 115,200).

Specifications	USB 1.1 Full Speed (Bulk transfer)				
Files used	kmsecm700.inf				
	usbser.sys,	serenum.sys			
	Windows st	tandard drivers. Separate installation is not			
	necessary.	essary.			
Communication	Baud rate	9,600/ 19,200/ 38,400/ 57,600/ 115,200 (default)/			
specifications	230,400/ 460,800/ 921,600				
	Data length	8 bits			
	Parity	None			
	Stop bits	1			
	Flow control	None			

Installing the kmsecm700.inf file

- 1) Copy the kmsecm700.inf file to a folder on your computer.
- 2) Switch on the CM-700d/CM-600d and connect the instrument to the PC with the USB cable.
- 3) When the Found New Hardware Wizard appears, specify the folder used in 1) above as the driver location.
- 4) The OS will install the driver and allot a COM port for the instrument.
 - * When 4) has been completed, the COM port allotted to the instrument can be checked by looking at Ports (COM & LPT) in the Device Manager of the OS.

1.1.2 Bluetooth

For Bluetooth communication, the SPP (Serial Port Profile) is used, and communication with a PC can be performed with the instrument configured as using a COM port. The specifications of Bluetooth communication are stated below. For baud rate, communication can be performed regardless of the setting (default is 57,600).

Specifications	Bluetooth 1.2	
Communication specifications	Baud rate	9,600/ 19,200/ 38,400/ 57,600 (default)/ 115,200/ 230,400/ 460,800/ 921,600
	Data length	8 bits
	Parity	None
	Stop bits	1
	Flow control	None

1.2 Communication mode

The instrument is equipped with standalone and communication modes. In standalone mode, various operations are performed by pressing the appropriate buttons on the instrument. In communication mode, operations can be performed only via communication with a PC.

When performing communication with a PC, the instrument must be in communication mode. When the instrument is in communication mode, the instrument can receive all commands; if the unit is in standalone mode, the following procedure must be performed according to the communication method.

USB	When the instrument is connected to a PC using a USB cable, the instrument is automatically switched to communication mode. When the cable is disconnected, the instrument automatically returns to standalone mode.
Bluetooth	When the instrument receives an SPP connection request from a PC, the instrument is automatically set to communication mode. When a disconnection request is received from the PC, or when communication conditions become poor, the instrument automatically returns to standalone mode.

1.3 Delimiter

When sending commands from a PC to the instrument, it is necessary to add a delimiter at the end of the command. In the case of the CM-700d/CM-600d, the delimiter that should be used is CR (carriage return) + LF (line feed). When the instrument responds to a command from the PC, the delimiter it adds at the end of its response will be the same delimiter that it received from the instrument. If no delimiter code is added to the command, the command will not be properly recognized. In such case, when more than 30 seconds has passed after receiving the last character of the command, the instrument will automatically clear its receive buffer and the command will be ignored.

1.4 Format for sent/received character string

Sent character strings must have the format and number of characters stated in this document. If the number of characters for data is less than the required number of characters, " " (space) should be added to fulfill the required number. However, for commands containing certain data items such as name (comment) that may contain " " (space) as desired, they will be accepted even if they do not contain the stated number of characters.

In the same way, for received strings commands containing certain data items such as name (comment) may not return the stated number of characters.

1.5 Timeout setting

In general, the timeout time should be set to at least 5 seconds. If the command requires a longer timeout time, it will be stated in the command description in this document.

1.6 Storage of settings and data

Settings and data set using commands can also be used when the instrument is in standalone mode. The settings and data are stored in the instruments internal memory.

1.7 Handling of commands during measurement

Once a measurement has been started using the "MES" command, the instrument will not accept any command other than "STR" until the measurement has been completed. If a command other than "STR" is sent, the response from the instrument will be "ER00" (Input of invalid command). Also, when "STR" is sent to the instrument during this period, the response will be "ER35" (Measurement in progress).

2 Product commands

2.1 Command table

Commond	Description	Domo
Command	Description	Page
Instrument		40
IDR	Reads instrument information: Product code, ROM version, serial number, geometry, wavelength information	12
STR	Reads instrument status information: Ready to measure, battery condition, calibration condition, number of stored targets, maximum number of stored targets, number of stored measurements, maximum number of stored measurements	13
Condition s	settings	
CPR	Reads measurement conditions: Measurement area, SCI/SCE mode, delay time, number of measurements for automatic averaging, number of measurements for manual averaging	15
CPS	Sets measurement conditions: Measurement area, SCI/SCE mode, delay time, number of measurements for automatic averaging, number of measurements for manual averaging	16
CRR	Reads colorimetric and display parameters: Observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index	17
CRS	Sets colorimetric and display parameters: Observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index	19
ECR	Reads instrument environment parameter conditions: SCI/SCE mode, observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index, delay time, number of measurements for automatic averaging, number of measurements for manual averaging	21
ECS	Sets instrument environment parameter conditions: SCI/SCE mode, observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index, delay time, number of measurements for automatic averaging, number of measurements for manual averaging	23
ENR	Reads number of currently set instrument environment.	25
ENS	Selects instrument environment number.	26
EIR	Reads identification name of instrument environment.	27
EIS	Sets identification name of instrument environment.	28
Calibration		
CIR	Reads calibration plate ID number.	29
CIS	Sets calibration plate ID number.	30
CDR	Reads calibration data.	31
CDS	Sets calibration data.	32
UCR	Reads user calibration data.	33
UCS	Sets user calibration data.	34
USR	Reads user calibration on/off status.	35
USS	Sets user calibration on/off status.	36

Calibration	Operations			
ZRC	Performs zero calibration.	37		
CAL	Performs white calibration.	38		
USC	Performs user calibration.	39		
Measureme		1		
MES	Performs a measurement.	40		
MDR				
COR		42		
SWS	Enables/disables instrument's measuring button.	45		
RDR	Reads measurement data taken using instrument's	46		
	measuring button.			
RCR	3			
Measureme	ent values	•		
SPR	Reads properties (measurement area, SCI/SCE mode,	50		
	date, time, target number, condition on/off, and comment)			
	for the specified measurement data.			
SDR	Reads the specified measurement data (spectral	52		
	reflectance data)			
SDD	Deletes the specified measurement.	53		
SAD	Deletes all measurements.	54		
Target cold	or	-		
TNR	Reads the active target number.	55		
TNS	Sets the active target number.	56		
TPR	Reads the properties of the specified target color:	57		
	Measurement area, SCI/SCE mode, date, time, target			
	color type, Cond. on/off, comment)			
TDR	Reads the target color data (spectral reflectance or	58		
	colorimetric data) for the specified target number.			
TDS	Sets the target color data (spectral reflectance or	60		
	colorimetric data) for the specified target number.			
TTD	Returns the tolerance values set for the specified target	63		
	number to the default tolerance values.			
TTR	Reads the tolerance values set for the specified target	64		
	color: Color space, color difference equation, index,			
	tolerances, parametric coefficients			
TTS	Sets the tolerance values set for the specified target color:	67		
	Color space, color difference equation, index, tolerances,			
	parametric coefficients			
TDD	Deletes the specified target color.	71		
TAD	Deletes all target colors.	72		
TOR	Reads the default tolerance settings for the specified	73		
	registration number.			
TOS	Sets the default tolerance settings for the specified	76		
	registration number.			
TOD	Deletes the default tolerance settings for the specified	80		
	registration number.			
TIR	Reads the name for the default tolerance settings for the	81		
	specified registration number.			
TIS	Sets the name for the default tolerance settings for the	82		
	specified registration number.			
Settings; O		_		
APR	Reads the automatic printing setting.	83		

KMSE A0E8-CS 0133E July 19, 2013

APS	Sets the automatic printing setting.	84
DFR	Reads the date format.	85
DFS	Sets the date format.	86
DPR	Reads the data properties: Data protection, list setting,	87
DDC	measurement screen setting, target color screen setting	00
DPS	Sets the data properties: Data protection, list setting,	88
	measurement screen setting, target color screen setting	
DTR	Reads the current date and time.	89
DTS	Sets the date and time.	90
LAR	Reads the language setting.	91
LAS	Sets the language setting.	92
LPR	Reads the power save setting (time until power save is	93
	activated).	
LPS	Sets the power save setting (time until power save is	94
	activated).	
OVR	Reads the enabled/disabled status of overwrite warning	95
	message.	
OVS	Enables/disables display of overwrite warning message.	96
DSP	Stores character strings to show in display.	97
DSC	Deletes character strings to show in display.	98
DSF	Enables/disables display of stored character string in	99
	display.	
ATR	Reads the enabled/disabled status of auto target function.	100
ATS	Enables/disables auto target function.	101

2.2 Command details

2.2.1 Instrument / Status

IDB	(Ido	ntification Boad\				
	IDR (<u>Id</u> entification <u>R</u> ead) Function					
		instrument information.				
		utput Format				
		-		1		
"IDI	R" +	Delimiter code		\Rightarrow		
				" Error-check code ,[1,2,3,4,5,6,		
Cor	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
Res	spon	se Parameters	-			
	Mea	aning	Type; No. of characters	Details/range		
1	Model identification		Integer; 4	0100: CM-700d 0110: CM-600d		
2	ROM version		Integer; 7	xxxxxxx: Indicates version is x.xx.xxxx.		
3	Body serial number		Integer; 8	xxxxxxxx		
4	Geometry identification		Integer; 2	00: di:8°/de:8°		
5	Min	imum wavelength	Integer; 3	400		
6	Max	kimum wavelength	Integer; 3	700		
7	Wav	velength pitch	Integer; 2	10		
Exp	olana	tion				
	Reads the instrument's ID information: Product code, ROM version, serial number, geometry, wavelength information.					
Erro	or-ch	eck codes				
Co	ode	Meaning				
OK0	0	Command was proces	ssed normally			
OK03	3	Battery power of instr	ument is gettin	ng low.		
ER00 Invalid command string received.						
ER02	2	Battery power is too low for measurements.				

STR	(<u>St</u> atus <u>R</u> ead)						
Fun	Function						
R	Reads instrument status information.						
Inpu	ıt/Output Format						
[Instr	rument ROM ver. less than	1.10]					
	"STR" + Delimiter o	code	⇔				
[Instr	rument ROM ver. 1.10 or lat	ter]					
	"STR" + Delimiter o	code	↔				
Con	nmand Parameters						
	Meaning	Type; No. of characters	Details/range				
Res	ponse Parameters						
	Meaning	Type; No. of characters	Details/range				
1	Flash ready status	Integer; 1	0: Not ready to flash 1: Ready to flash				
2	Voltage status	Integer; 1	0: Normal level 1: Warning level 2: Error level				
3	Calibration status (for current SCI/SCE and measurement area settings)	Integer; 1	0: Zero calibration not performed, white calibration not performed, user calibration not performed 1: Zero calibration completed, white calibration not performed 2: Zero calibration completed, user calibration not performed 3: Ready to take measurement				
4	Total data capacity	Integer; 5	05000 (fixed)				
5	Sample data count	Integer; 5	00000 to 04000				
6	Target data count	Integer; 5	00001 to 01000				
7	Standard/Custom	Integer; 1	0: Standard 1: Custom				
8	Calibration status warning	Integer; 1	 0: Not in calibration warning status 1: In calibration warning status (calibration is recommended) Not output when instrument ROM version is less than 1.10. 				

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

9	Number of storable target data	Integer; 5	 01000 (fixed) Not output when instrument ROM version is less than 1.10.
---	--------------------------------	------------	--

Explanation

Reads instrument status information: Ready to measure, battery condition, calibration condition, number of stored targets, maximum number of stored targets, number of stored measurements, maximum number of stored measurements, calibration warning status, and maximum storable number of targets.

[3] Calibration warning status indicates whether or not white or user calibration has been performed since the instrument was most recently switched on. It corresponds to the "WR121 CALIBRATION RECOMMENDED" warning message for standalone use of the instrument. "1" will be output when white or user calibration was performed previously, but has not been performed since most recent switching on of instrument. Measurement can still be performed, but in general to ensure best accuracy white or user calibration should be performed whenever the instrument has been switched off and on again.

Error-check codes				
Code	Meaning			
OK00	Command was processed normally			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			
ER35	Measurement in process			

2.2.2 Condition settings

CPF	R (<u>C</u> ondition <u>P</u> aramete	r <u>R</u> ead)				
Fun	ection					
F	Reads measurement condition	ns.				
Inp	ut/Output Format					
"CPF	R" + Delimiter code		⇒			
Cor	nmand Parameters					
	Meaning	Type; No. of characters	Details/range			
Res	ponse Parameters					
Meaning Type; No. of characters Details/range		Details/range				
1	Measurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV			
2	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE			
3	Delay time (from pressing measuring button to taking measurement)	Integer; 2	00 to 30 (10x actual time in seconds: 0.0 to 3.0)			
4	Number of measurements for automatic averaging	Integer; 2	01 to 10			
5	Number of measurements for manual averaging	Integer; 2	01 to 30			
_						

Explanation

Reads measurement conditions: Measurement area, SCI/SCE mode, delay time, number of measurements for automatic averaging, number of measurements for manual averaging. These conditions are used when the instrument is used standalone (not connected to the computer) with COND. set to off, or in communication mode (connected to PC). However, the number of measurements for manual averaging setting is not used in communication

mode. This command is treated in the same way as ECR with command parameter set to "0" (COND not used).

Error-ch	Error-check codes			
Code	Code Meaning			
OK00	Command was processed normally			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			

CP	CPS (Condition Parameter Set)					
Fur	Function					
5	Sets measurement conditions	•				
Inp	ut/Output Format					
"CP	s,1,2,3,4,5" + <i>Delin</i>	iter code	\Rightarrow			
Coı	mmand Parameters					
	Meaning	Type; no. of char.	Details/range			
1	Measurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV			
2	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE			
3	Delay time (from pressing measuring button to taking measurement)	Integer; 2	00 to 30 (10× actual time in seconds: 0.0 to 3.0)			
4	Number of measurements for automatic averaging	Integer; 2	01 to 10			
5	Number of measurements for manual averaging	Integer; 2	01 to 30			
Res	sponse Parameters					
	Meaning	Type; No. of characters	Details/range			
Exp	Explanation					
r v F t	Sets measurement conditions: Measurement area, SCI/SCE mode, delay time, number of measurements for automatic averaging, number of measurements for manual averaging. These conditions are used when the instrument is used standalone (not connected to the computer) with COND. set to off, or in communication mode (connected to PC). For measurement area, the setting value is compared with the current instrument lens setting, and if they are not matched, "ER25" is returned. The number of measurements for manual averaging setting is not used in communication mode.					

The number of measurements for manual averaging setting is not used in communication mode. This command is treated in the same way as ECS with command parameter set to "0" (COND not used).

Error-check codes				
Code	Meaning			
OK00	Command was processed normally			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			
ER03	Input parameter error.			
ER25	Input measurement area and instrument lens position do not match.			

CRE	CRR (<u>C</u> olorimetric Pa <u>r</u> ameter <u>R</u> ead)						
Fun	Function						
R	Reads colorimetric and display parameters.						
Inpu	Input/Output Format						
"CRF	R" + Delimiter code		⇒				
Con	nmand Parameters						
	Meaning	Type; No. of characters	Details/range				
Res	ponse Parameters						
	Meaning	Type; No. of characters	Details/range				
1	Observer	Integer; 1	1: 2° 2: 10°				
2	Illuminant 1	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12				
3	Illuminant 2	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12 00: None				
<u> </u>	Display format	Integer; 10	000000001: Absolute values 0000000010: Color difference values 0000000100: Absolute and difference 0000001000: Judgment 0000010000: Graph (Spectral) 000100000: Graph (Color difference) 0001000000: Pseudocolor patches 0010000000: Assessment Each display format is enabled by setting a "1" in the appropriate column. Selection of multiple display formats is possible (switching between formats can then be performed using the < or > buttons on the instrument). For example, setting "0001000010" would enable both Color difference values and Pseudocolor patches displays, which could be switched between using the < or > buttons.				
5	Color space	Integer; 2	01: L*a*b* 02: L*C*h 03: Hunter Lab 04: Yxy 05: XYZ 06: Munsell				
6	Color-difference equation	Integer; 2	01: ΔE* (1976) 02: CMC (I:c) 03: ΔE* (1994) 04: ΔE* (2000)				

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

7	Index	Integer; 2	00: None
			01: WI (ASTM E313-73) 02: WI (ASTM E313-96)
			03: YI (ASTM E313-73) 04: YI (ASTM D1925)
			05: ISO Brightness 06: 8° gloss

Explanation

Reads colorimetric and display parameters: Observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index measurement conditions.

These conditions are used when the instrument is used standalone (not connected to the computer) with COND. set to off.

The font size used for display formats "Absolute values" and "Color difference values" is larger than the font size used for "Absolute and difference values".

This command is treated in the same way as ECR with command parameter set to "0" (COND not used).

Error-check codes					
Code	Meaning				
OK00	Command was processed normally				
OK03	Battery power of instrument is getting low.				
ER00	Invalid command string received.				
ER02	Battery power is too low for measurements.				

CR	CRS (Colorimetric Parameter Set)					
Fur	ection					
5	Sets colorimetric and display p	oarameters.				
Inp	ut/Output Format					
"CR	5,1,2,3,4,5,6,7" +		\Rightarrow			
De.	limiter code		·			
Cor	nmand Parameters	1				
	Meaning	Type; No. of characters	Details/range			
1	Observer	Integer; 1	1: 2° 2: 10°			
2	Illuminant 1	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12			
<u>'M</u>	Illuminant 2	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12 00: None			
4	Display format	Integer; 10	000000001: Absolute values 0000000010: Color difference values 0000000100: Absolute and difference 0000001000: Judgment 0000010000: Graph (Spectral) 00001000000: Graph (Color difference) 0001000000: Pseudocolor patches 0010000000: Assessment			
			Each display format is enabled by setting a "1" in the appropriate column. Selection of multiple display formats is possible. For example, setting "0001000010" means both Color difference values and Pseudocolor patches displays are enabled.			
5	Color space	Integer; 2	01: L*a*b* 02: L*C*h 03: Hunter Lab 04: Yxy 05: XYZ 06: Munsell			
6	Color-difference equation	Integer; 2	01: ΔE* (1976) 02: CMC (l:c) 03: ΔE* (1994) 04: ΔΕ* (2000)			
7	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 02: WI (ASTM E313-96) 03: YI (ASTM E313-73) 04: YI (ASTM D1925) 05: ISO Brightness 06: 8° gloss			
Res	sponse Parameters					
	Meaning Type; No. of characters Details/range					
F	Fundamentians					
Exp	Explanation					

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

Sets colorimetric and display parameters: Observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index measurement conditions.

These conditions are used when the instrument is used standalone (not connected to the computer) with COND. set to off.

The font size used for display formats "Absolute values" and "Color difference values" is larger than the font size used for "Absolute and difference values".

This command is treated in the same way as ECS with command parameter set to "0" (COND not used).

Error-check codes					
Code	Meaning				
OK00	Command was processed normally				
OK03	Battery power of instrument is getting low.				
ER00	Invalid command string received.				
ER02	Battery power is too low for measurements.				
ER03	Input parameter error.				

EC	ECR (Environment Condition Parameter Read)						
Fui	Function						
ı	Reads parameter conditions for the specified instrument environment number						
Inp	ut/Output Format						
"EC	R,1" + Delimiter code		\Rightarrow				
	\(\tau \text{"\text{Error-check code}} \begin{aligned} \begin{aligned} \pi & \text{Error-check code} & \pi						
Co	mmand Parameters						
	Meaning	Type; No. of characters	Details/range				
1	Instrument environment number	Integer; 1	No environment. Results are a combination of those that would be obtained using CPR and CRR. 1 to 8: Instrument environment				
Res	sponse Parameters						
	Meaning	Type; No. of characters	Details/range				
1	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE				
2	Delay time (from pressing measuring button to taking measurement)	Integer; 2	00 to 30 (10x actual time in seconds: 0.0 to 3.0)				
3	Number of measurements for automatic averaging	Integer; 2	01 to 10				
4	Number of measurements for manual averaging	Integer; 2	01 to 30				
5	Observer	Integer; 1	1: 2° 2: 10°				
6	Illuminant 1	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12				
[7]	Illuminant 2	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12 00: None				
<u>(8)</u>	Display format	Integer; 10	0000000001: Absolute values 0000000010: Color difference values 0000000100: Absolute and difference 0000001000: Judgment 0000010000: Graph (Spectral) 0000100000: Graph (Color difference) 0001000000: Pseudocolor patches 0010000000: Assessment Each display format is enabled by setting a "1" in the appropriate column. Selection of multiple display formats is possible (switching between formats can then be performed using the < or > buttons on the instrument). For example, setting "0001000010" would enable both Color difference values and				

			Pseudocolor patches displays, which could be switched between using the < or > buttons.	
9	Color space	Integer; 2	01: L*a*b* 03: Hunter Lab 05: XYZ	02: L*C*h 04: Yxy 06: Munsell
10	Color-difference equation	Integer; 2	01: ΔE* (1976) 03: ΔE* (1994)	02: CMC (I:c) 04: ΔE* (2000)
11	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 03: YI (ASTM E313-73) 05: ISO Brightness	02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss

Explanation

Reads parameter conditions for the specified instrument environment number: SCI/SCE mode, observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index, delay time, number of measurements for automatic averaging, number of measurements for manual averaging.

When Instrument Environment Number is set to "0", results are a combination of those that would be obtained using CPR and CRR.

Error-ch	Error-check codes				
Code	Meaning				
OK00	Command was processed normally				
OK03	Battery power of instrument is getting low.				
ER00	Invalid command string received.				
ER02	Battery power is too low for measurements.				
ER03	Input parameter error.				

EC:	ECS (Environment Condition Parameter Set)						
	Function						
5	Sets parameter conditions for the specified instrument environment number						
Inp	ut/Output Format						
	5,1,2,3,4,5,6,7,8,9, Delimiter code	10,11,12"	⇔				
			□ Error-check code " + Delimiter code Co				
Cor	nmand Parameters						
	Meaning	Type; No. of characters	Details/range				
1	Instrument environment number	Integer; 1	No environment. Effect is the same as a combination of those that would result from using CPS and CRS. 1 to 8: Instrument environment				
2	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE				
3	Delay time (from pressing measuring button to taking measurement)	Integer; 2	00 to 30 (10× actual time in seconds: 0.0 to 3.0)				
4	Number of measurements for automatic averaging	Integer; 2	01 to 10				
5	Number of measurements for manual averaging	Integer; 2	01 to 30				
6	Observer	Integer; 1	1: 2° 2: 10°				
7	Illuminant 1	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12				
8	Illuminant 2	Integer; 2	01: A 02: C 03: D50 04: D65 05: F2 06: F6 07: F7 08: F8 09: F10 10: F11 11: F12 00: None				
<u>(5)</u>	Display format	Integer; 10	0000000001: Absolute values 0000000010: Color difference values 0000000100: Absolute and difference 0000001000: Judgment 0000010000: Graph (Spectral) 0000100000: Graph (Color difference) 0001000000: Pseudocolor patches 001000000: Assessment Each display format is enabled by setting a "1" in the appropriate column. Selection of multiple display formats is possible (switching between formats can then be performed using the < or > buttons on the instrument). For example, setting "0001000010" would enable both Color difference values and Pseudocolor patches displays, which could be switched between using the < or > buttons.				

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

10	Color space	Integer; 2	01: L*a*b* 03: Hunter Lab 05: XYZ	02: L*C*h 04: Yxy 06: Munsell
11	Color-difference equation	Integer; 2	01: ΔE* (1976) 03: ΔE* (1994)	02: CMC (I:c) 04: ΔE* (2000)
12	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 03: YI (ASTM E313-73) 05: ISO Brightness	02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss
Res	ponse Parameters			
	Meaning	Type; No. of characters	Details/range	

Explanation

Sets parameter conditions for the specified instrument environment number: SCI/SCE mode, observer, illuminant 1, illuminant 2, display format, color space, color-difference equation, index, delay time, number of measurements for automatic averaging, number of measurements for manual averaging.

When Instrument Environment Number is set to "0", effect is the same as a combination of those that would result from using CPS and CRS.

Error-ch	Error-check codes				
Code	Meaning				
OK00	Command was processed normally				
OK03	Battery power of instrument is getting low.				
ER00	Invalid command string received.				
ER02	Battery power is too low for measurements.				
ER03	Input parameter error.				

ENI	ENR (<u>E</u> nvironment <u>N</u> umber <u>R</u> ead)							
Fur	Function							
F	Reads	current active instrume	nt environmen	t number				
Inp	ut/Oı	utput Format						
"EN	R" +	Delimiter code		⇔				
				<pre></pre>				
Cor	nma	nd Parameters						
	Mea	aning	Type; No. of characters	Details/range				
Res	spon	se Parameters						
	Mea	aning	Type; No. of characters	Details/range				
1	Inst num	rument environment nber	Integer; 1	0: No environment. 1 to 8: Instrument environment				
Exp	olana	tion						
		current active instrume Instrument Environmen		t number. et to "0", no environment is active.				
Erre	rror-check codes							
Co	ode	Meaning						
OK0	0	Command was processed normally						
OK0	3	Battery power of instr	ument is gettin	g low.				
ER0	0	Invalid command strin	g received.					
ER0	2	Battery power is too lo	ow for measure	ements.				

ENS (<u>E</u> ı	ENS (<u>E</u> nvironment <u>N</u> umber <u>S</u> et)						
Functio	Function						
Sets a	ctive instrument environ	ment number					
Input/O	utput Format						
"ENS,1"	+ Delimiter code	?	⇔				
Comma	nd Parameters						
Me	aning	Type; No. of characters	Details/range				
1	trument environment nber	Integer; 1	0: No environment. 1 to 8: Instrument environment				
Respon	se Parameters						
Me	aning	Type; No. of characters	Details/range				
Explana	ation						
When	Sets active instrument environment number. When Instrument Environment Number is set to "0", no environment number is active and the conditions set using CPS and CRS are used.						
Error-cl	Error-check codes						
Code	Meaning						
OK00	Command was processed normally						
OK03	Battery power of instrument is getting low.						
ER00	Invalid command string received.						
ER02	Battery power is too lo	w for measure	ements.				
ER03	Input parameter error.						

EIR	EIR (<u>E</u> nvironment <u>I</u> dentification <u>R</u> ead)						
Fun	Function						
F	Reads	the identification name	set for the spe	ecified instrument environment number.			
Inp	ut/Oı	utput Format					
"EII	R, 1"	+ Delimiter code		⇒			
	⇔ "Error-check code , i" + Delimiter code						
Cor	nma	nd Parameters					
	Mea	aning	Type; No. of characters	Details/range			
1	Inst	rument environment nber	Integer; 1	1 to 8: Instrument environment			
Res	pon	se Parameters					
	Mea	aning	Type; No. of characters	Details/range			
1	Ider	ntification name	Character; 11				
Exp	lana	tion					
F	Reads	the identification name	for the specifie	ed instrument environment number.			
Erro	or-ch	neck codes					
Co	Code Meaning						
OK00	0 Command was processed normally						
OK03	Battery power of instrument is getting low.						
ER00	R00 Invalid command string received.						
ER02	2	Battery power is too lo	w for measure	ements.			
ER03	3	Input parameter error.					

EIS (EIS (Environment Identification Set)					
Func	Function					
Set	ts the identification name se	et for the speci	fied instrument environment number.			
Input	/Output Format					
"EIS,	1,2" + Delimiter co	ode	\Rightarrow			
Com	mand Parameters					
	Meaning	Type; No. of characters	Details/range			
1	Instrument environment number	Integer; 1	1 to 8: Instrument environment			
2	Identification name	Character; 11	(See <u>4. Character codes</u> .)			
Resp	onse Parameters					
	Meaning	Type; No. of characters	Details/range			
Expla	anation					
Set	ts the identification name fo	r the specified	instrument environment number.			
Error	-check codes					
Code	Code Meaning					
OK00	Command was proces	Command was processed normally				
OK03	Battery power of instrument is getting low.					
ER00	Invalid command strin	g received.				
ER02	Battery power is too lo	w for measure	ements.			
ER03	Input parameter error.	Input parameter error.				

2.2.3 Calibration settings

CIR	CIR (White <u>C</u> alibration Plate <u>I</u> dentification <u>R</u> ead)						
	Function						
R	eads	the white calibration pla	ate identificatio	on number currently set on the instrument.			
Inpu	ıt/Oı	utput Format					
"CIR	L" +	Delimiter code		\Rightarrow			
				<pre></pre>			
Con	nma	nd Parameters					
	Mea	aning	Type; No. of characters	Details/range			
Res	pon	se Parameters					
	Mea	aning	Type; No. of characters	Details/range			
1		te calibration plate tification number	Integer; 7				
Ехр	lana	tion					
R	eads	the white calibration pla	ate identification	on number currently set on the instrument.			
Erro	r-ch	eck codes					
Co	Code Meaning						
ОК00)	Command was processed normally					
OK03		Battery power of instru	ument is gettin	g low.			
ER00)	Invalid command strin	g received.				
ER02	}	Battery power is too lo	w for measure	ements.			

CIS	CIS (White <u>C</u> alibration Plate <u>I</u> dentification <u>S</u> et)							
Fun	Function							
S	ets th	e white calibration plate	identification	number	on the instrument.			
Inpu	ut/Oı	utput Format						
"CIS	S , 1 "	+ Delimiter code		\Rightarrow				
	⇔ <u>Error-check code</u> " + <u>Delimiter</u>							
Con	nma	nd Parameters		•				
	Mea	aning	Type; No. of characters	Details	r/range			
1	White calibration plate Ir identification number		Integer; 7					
Res	pon	se Parameters						
	Mea	aning	Type; No. of characters	Details	r/range			
Exp	lana	tion						
S	Sets th	e white calibration plate	identification	number	on the instrument.			
Erro	or-ch	neck codes						
Со	ode Meaning							
OK00)	Command was processed normally						
OK 0 3	3	Battery power of instru	ument is gettin	g low.				
ER00)	Invalid command strin		·				
ER02	2	Battery power is too lo	w for measure	ements.				
ER03	3	Input parameter error.						

CDR	CDR (White <u>C</u> alibration <u>D</u> ata <u>R</u> ead)					
Fun	Function					
R	eads	the white calibration da	ta currently se	t on the instrument.		
Inpu	ıt/Oı	ıtput Format				
"CDR	, 1, 2	" + Delimiter co	ode	\Rightarrow		
Con	nmai	nd Parameters				
	Mea	ning	Type; No. of characters	Details/range		
1	Mea	surement area	Integer; 1	1: SAV (CM-700d only) 2: MAV		
2	SCI	SCE mode	Integer; 1	1: SCI 2: SCE		
Res	pons	se Parameters				
	Mea	ning	Type; No. of characters	Details/range		
1		te calibration value Inm)	Integer; 6	080000 to 110000 (1000× actual value: 80.000 to 110.000)		
31		te calibration value nm)	Integer; 6	080000 to 110000 (1000× actual value: 80.000 to 110.000)		
Exp	lana	tion				
	Reads the white calibration data currently set on the instrument for the specified measurement area and SCI/SCE setting.					
Erro	Error-check codes					
Cod	de Meaning					
OK00		Command was processed normally				
OK03		Battery power of instrument is getting low.				
ER00		Invalid command strin	g received.			
ER02		Battery power is too lo		ements.		
ER03		Input parameter error.				

CDS	CDS (White <u>Calibration Data Set</u>)					
	Function					
S	Sets the white calibration data on the instrument.					
Inpu	ut/Ou	utput Format				
		2 ,[3, 4 [31,[32,[33	" +			
		er code	.	⇒		
				□ Error-check code" + Delimiter □ code □		
Con	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Mea	asurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV		
2	SCI	/SCE mode	Integer; 1	1: SCI 2: SCE		
3		ite calibration value Onm)	Integer; 6	080000 to 110000 (1000× actual value: 80.000 to 110.000)		
33		ite calibration value Onm)	Integer; 6	080000 to 110000 (1000× actual value: 80.000 to 110.000)		
Res	pon	se Parameters				
	Mea	aning	Type; No. of characters	Details/range		
Ехр	lana	ition				
	Sets the white calibration data on the instrument for the specified measurement area and SCI/SCE setting.					
Erro	Error-check codes					
Co	Code Meaning					
OK00		Command was proces	ssed normally			
OK 0 3	Battery power of instrument is getting low.					
ER00)	Invalid command strin	g received.			
ER02	2	Battery power is too lo	w for measure	ements.		
ER03	3	Input parameter error.				

UCR	UCR (<u>U</u> ser <u>C</u> alibration Data <u>R</u> ead)						
Fun	Function						
R	Reads the user calibration data currently set on the instrument.						
Inpu	ıt/Oı	utput Format					
"UCR	2,[1],[2	2" + Delimiter co	ode	\Rightarrow			
				()	Error-check code ,1,2,3 9,30,31" + Delimiter code		
Con	nma	nd Parameters					
	Mea	aning	Type; No. of characters	Details/rar	nge		
1	Mea	asurement area	Integer; 1	1: SAV (C	M-700d only) 2: MAV		
2	SCI	/SCE mode	Integer; 1	1: SCI	2: SCE		
Res	Response Parameters						
	Mea	eaning Type; N		Details/rar	nge		
1		er calibration value Onm)	Integer; 6	050000 to 150.000)	0 150000 (1000× actual value: 50.000 to		
31		White calibration value Integer; 6 700nm)		050000 to	150000 (1000× actual value: 50.000 to		
Ехр	lana	tion					
Reads the user calibration data currently set on the instrument for the specified measurement area and SCI/SCE setting.							
Erro	Error-check codes						
Code		Meaning					
OK00	Command was processed normally						
OK03	3	Battery power of instrument is getting low.					
ER00	Invalid command string received.						
ER02	2	Battery power is too low for measurements.					
ER03	3	Input parameter error.					
ER10		No data present.					

UCS	IICS (Ilgar Calibration Data Sat)					
	UCS (<u>U</u> ser <u>C</u> alibration Data <u>S</u> et)					
-	Sets the user calibration data on the instrument.					
			on the modulin	ent.		
_		utput Format	ī.,			
		2,3,4 31,32,33 	<u>(</u> " +	⇒		
Del:	imite	er code				
Con	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Mea	asurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV		
2	SCI	/SCE mode	Integer; 1	1: SCI 2: SCE		
3	User calibration value Integer; 6 (400nm)		Integer; 6	050000 to 150000 (1000× actual value: 50.000 to 150.000)		
33		User calibration value Integer; 6 (700nm)		050000 to 150000 (1000× actual value: 50.000 to 150.000)		
Res	Response Parameters					
	Mea	Meaning Type; No. of characters		Details/range		
Ехр	lana	tion				
Sets the user calibration data on the instrument for the specified measurement area and SCI/SCE setting.						
Error-check codes						
Code Meaning						
OK 0 C						
OK 0 3	Battery power of instrument is getting low.					
ER00)	Invalid command string received.				
ER02	2	Battery power is too low for measurements.				
ER03	Input parameter error.					

USF	USR (<u>U</u> ser Calibration <u>S</u> tatus <u>R</u> ead)					
Fun	Function					
R	eads	user calibration enable	d/disabled stat	tus.		
Inpu	ut/Ou	utput Format				
"USR	"USR" + Delimiter code					
				⇔ "Error-check code ,[1]" + Delimiter code		
Command Parameters						
	Mea	aning	Type; No. of characters	Details/range		
Res	Response Parameters					
	Mea	eaning Type; No. of characters Details/range		Details/range		
1		ser calibration nabled/disabled status Integer; 1 0: Disabled 1: Enabled		0: Disabled 1: Enabled		
Ехр	lana	tion				
R	eads	enabled/disabled statu	s of user calib	ration.		
Erro	Error-check codes					
Code		Meaning				
OK00)	Command was processed normally				
OK 0 3	3	Battery power of instrument is getting low.				
ER00)	Invalid command string received.				
ER02	2 Battery power is too low for measurements.					

USS	USS (<u>U</u> ser Calibration <u>S</u> tatus <u>S</u> et)					
Function						
S	Sets u	ser calibration enabled/	disabled status	s.		
Inpu	ut/O	utput Format				
	"USS, 1" + Delimiter code					
Con	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1		er calibration bled/disabled status	Integer; 1	0: Disabled 1: Enabled		
Response Parameters						
	Mea	aning	Type; No. of characters	Details/range		
Exp	Explanation					
Sets enabled/disabled status of user calibration. When user calibration is enabled and user calibration has been performed, measurements can be taken (regardless of whether or not white calibration has been performed).						
Erro	Error-check codes					
Code		Meaning				
OK00 Command was processed normally		ssed normally				
OK03	Battery power of instrument is getting low.			ng low.		
ER00	Invalid command string received.					
ER02	2	Battery power is too low for measurements.				
ER03	Input parameter error.					

2.2.4 Calibration Operations

ZRC (Z	e <u>r</u> o <u>C</u> alibration)			
Function				
Perfor	ms zero calibration.			
Input/O	utput Format			
"ZRC" +	Delimiter code		⇒	
			" Error-check code" + Delimiter ⇔	
			code	
Comma	and Parameters			
Me	aning	Type; No. of characters	Details/range	
Respon	se Parameters			
Ме	eaning	Type; No. of characters	Details/range	
Explana	ation			
When		, it may be ned	measurement area and SCI/SCE setting) set using CPS. cessary to recalibrate at the new conditions.	
Error-c	heck codes			
Code	Meaning			
ОК00	Command was proces	ssed normally.		
OK02	Low xenon lamp illum	ination		
OK03	Battery power of instrument is getting low.			
OK04 Low xenon lamp illumination/low battery		ination/low bat	ttery power	
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			
ER05	Xenon lamp flash error			
ER11	Calibration not perform	ned correctly.		
ER13	A/D conversion error			
ER27	Charge circuit error			

CAL	CAL (White <u>Cal</u> ibration)				
	Function				
P	erforr	ms white calibration.			
Inpu	ıt/Oı	utput Format			
"CAL	," +	Delimiter code		⇒	
		1			
ĺ				\Leftrightarrow	" Error-check code" + Delimiter
					code
Con	ıma	nd Parameters			
	Mea	aning	Type; No. of characters	Details	/range
Res	pon	se Parameters			
	Mea	aning	Type; No. of characters	Details	/range
Ехр	lana	tion			
S0 th	CI/SC ne nev		PS. When cond	ditions ar	rmed at the conditions (measurement area and re changed, it may be necessary to recalibrate at
Errc	r-ch	neck codes			
Cod		Meaning			
OK00		Command was proces	ssed normally.		
OK02		Low xenon lamp illumi	ination		
OK03		Battery power of instru	ument is gettin	g low.	
OK04		Low xenon lamp illumi	ination/low bat	tery pow	/er
ER00		Invalid command string	g received.		
ER02		Battery power is too lo	w for measure	ements.	
ER05		Xenon lamp flash erro			
ER07		Zero calibration and w	hite calibratior	n have n	ot been performed.
ER11		Calibration not perform	ned correctly.		
ER13		A/D conversion error			
ER27	_ !	Charge circuit error			

USC (<u>Us</u> er <u>C</u> alibration)						
Fund	Function					
Pe	Performs user calibration.					
Inpu	ıt/Oı	utput Format				
"USC	! " +	Delimiter code		⇒		
				⟨⊐	" Error-check code" + Delimiter	
				,	code	
Com	ımaı	nd Parameters		•		
COII		aning	Type; No. of	Details	/range	
	IVICa	armig	characters	Details	vialige	
Res	pons	se Parameters				
	Mea	aning	Type; No. of characters	Details	/range	
Explanation						
Expl	lana	tion				
Pe So th Ti	erforn CI/SC e nev	ns user calibration. Use CE setting) set using CP w conditions. ut time should be set to	S. When cond 30 seconds or	ditions ar longer.	ed at the conditions (measurement area and e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Pe S0 th Ti If	erforn CI/SC e nev meou no us	ns user calibration. Use CE setting) set using CP w conditions. ut time should be set to	S. When cond 30 seconds or	ditions ar longer.	e changed, it may be necessary to recalibrate at	
Pe S0 th Ti If	erforn CI/SC e nev meou no us	ns user calibration. Use CE setting) set using CP w conditions. ut time should be set to ser calibration data have	S. When cond 30 seconds or	ditions ar longer.	e changed, it may be necessary to recalibrate at	
Person	erform CI/SC e nev meou no us or-ch	ns user calibration. Use EE setting) set using CP w conditions. Ut time should be set to ser calibration data have	2S. When cond 30 seconds or been set in the	ditions ar r longer. he instru	e changed, it may be necessary to recalibrate at	
Pe SO th Ti If	erforn CI/SC e nev meou no us or-ch	ns user calibration. Use CE setting) set using CP w conditions. ut time should be set to ser calibration data have neck codes Meaning	30 seconds of been set in the been set in the seed normally.	ditions ar r longer. he instru	e changed, it may be necessary to recalibrate at	
Person State of the Till If	erform CI/SC le new imeou no us or-ch	ns user calibration. Use EE setting) set using CP w conditions. ut time should be set to ser calibration data have neck codes Meaning Command was proces	30 seconds or been set in the been set in the seed normally.	ditions ar	e changed, it may be necessary to recalibrate at	
Person Signature of the	erforn CI/SC e nev meou no us pr-ch	ns user calibration. Use CE setting) set using CP w conditions. ut time should be set to ser calibration data have neck codes Meaning Command was proces Low xenon lamp illumi	30 seconds of a been set in the been set in the seed normally.	ditions ar r longer. he instru	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Person State of the Till If	erforn CI/SC le nev meou no us	ns user calibration. Use EE setting) set using CP w conditions. It time should be set to ser calibration data have neck codes Meaning Command was proces Low xenon lamp illuming Battery power of instru	30 seconds or been set in the been set in the seed normally. Ination	ditions ar r longer. he instru	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Prost of the state	erforn CI/SC ie nev imeou no us pr-ch de	ns user calibration. Use CE setting) set using CP w conditions. It time should be set to ser calibration data have neck codes Meaning Command was process Low xenon lamp illuming Low xenon lamp illuming Low xenon lamp illuming	2S. When conds of the been set in the seed normally. Interest in the seed normally. In the seed normally norma	g low.	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Person State of the Till of the Erro OK00 OK02 OK03 OK04 ER00	erform CI/SC e nev meou no us or-ch de	ns user calibration. Use EE setting) set using CP w conditions. ut time should be set to ser calibration data have neck codes Meaning Command was proces Low xenon lamp illumi Battery power of instruction. Low xenon lamp illumi Invalid command string	S. When conds of the been set in the been set in the seed normally. Ination furnation/low bate g received.	g low.	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Prost of the state	erforn CI/SC e nev imeou no us er-ch	ms user calibration. Use EE setting) set using CP w conditions. It time should be set to ser calibration data have seek codes Meaning Command was proces Low xenon lamp illumi Battery power of instruction invalid command string.	S. When cond 30 seconds on a been set in the seed normally. ination ument is getting ination/low bate g received.	g low.	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	
Pe St th Ti If If Erro OK00 OK02 OK03 OK04 ER00 ER02 ER05	erform CI/SC e nev meou no us or-ch de	ns user calibration. Use EE setting) set using CP v conditions. Use time should be set to ser calibration data have neck codes Meaning Command was proces Low xenon lamp illumi Battery power of instructory and instructor	S. When cond 30 seconds or e been set in the seed normally. ination ument is gettin ination/low bat g received. bw for measure white calibration	g low.	e changed, it may be necessary to recalibrate at ment, ER22 will be returned.	

No user calibration data stored in instrument.

White calibration has not been performed.

Charge circuit error

ER22

ER24

ER27

2.2.5 Measurement Operations

	- _					
ME	MES (<u>Me</u> asurement)					
Fun	ction					
S	Starts/interrupts measuremen	t.				
Inp	ut/Output Format					
"MES	S,1" + Delimiter code	2	ightharpoons			
	⇔ <u>"Error-check code</u> " + <u>Delimiter</u>					
Cor	nmand Parameters					
	Meaning	Type; No. of characters	Details/range			
Measurement operation Integer; 1		Integer; 1	1: Interrupt measurements (automatic averaging) 1: Take measurement (single measurement)/start measurements (automatic averaging)			
Res	Response Parameters					
	Meaning	Type; No. of characters	Details/range			

Explanation

When number of measurements for automatic averaging = 1: Takes a measurement.

When number of measurements for automatic averaging > 1: Starts a series of measurements for automatic averaging; can also be used to interrupt the series of measurements.

Measurements are taken according to the conditions set using CPS. Since calibration status are stored for each set of conditions, if conditions are changed it may be necessary to perform calibration again.

After a measurement (or measurement series for automatic averaging) has been successfully completed, measurement results can then be read from the instrument using MDR (for spectral data) or COR (for colorimetric data).

The instrument's buffer is cleared of data immediately before a measurement is taken; if a measurement error occurs, it is no longer possible to read the previous measured data using MDR or COR. This also applies when the measuring button is enabled and used for remote measurements.

Measurements taken using MES are not stored in the instrument's measurement memory. From the time when this command is sent to the instrument until the completion of the measurement or measurement series, the instrument will not respond to any command other than STR. When STR is sent during this time, the response will be ER35 (Measurement in process).

When auto averaging is being performed, this command can be used to interrupt the measurement series. Data measured as part of that series will be lost.

Error-ch	Error-check codes			
Code	Meaning			
OK00	Command was processed normally.			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			
ER03	Input parameter error			
ER05	Xenon lamp flash error			
ER07	Zero calibration and white calibration not performed.			

ER24	White calibration not performed. (Not output if User Calibration is enabled.)
ER36	User calibration not performed. (Not output if User Calibration is disabled.)



MDI	MDR (Measurement Data Read)					
Fun	Function					
R	Reads	spectral measurement	data in instrum	nent buffer.		
Inpu	ut/O	utput Format				
"MDF	R , 1 "	+ Delimiter code	.]	⇒		
	11	·				
				Error-check code , 1, 2, 3		
				29,30,31" + Delimiter code		
Con	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	SCI	/SCE mode	Integer; 1	1: SCI 2: SCE		
Res	pon	se Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1		asured reflectance Onm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)		
31		asured reflectance Onm)	Integer; 6	000000 to 020000 (100x actual value: 0.00 to 200.00)		
Ехр	lana	tion				
m If S	Reads the spectral measurement data held in the instrument's buffer immediately after a measurement is taken using MES. If data for the requested SCI/SCE mode is not available (for example, if measurement was taken in SCI mode and SCE data is requested using this command), ER10 will be output. Please see Appendix A for the flow of operations for measurement.					
Erro	or-ch	neck codes				
Co	de	Meaning				
OK00)	Command was processed normally.				
OK 0 3	3	Battery power of instrument is getting low.				
ER00	0 Invalid command string received.					
ER02	Battery power is too low for measurements.					
ER03	3	Input parameter error		_		
ER05	5	Xenon lamp flash erro	r	_		
ER10)	No data present.				
ER13	3	A/D conversion error				
ER27	7	Charge circuit error				

COR ("Color Data Read")

Function

Reads colorimetric measurement data calculated by the instrument after a measurement.

• This command can be used only with instruments having ROM version 1.14 or higher.

Input/Output Format

© Error-check code ,1" +

Delimiter code

Command Parameters

	Meaning	Type; No. of characters	Details/range		
1	SCI/SCE mode	Integer; 1	1: SCI	2: SCE	
2	Observer	Integer; 1	1: 2°	2: 10°	
3	Illuminant 1	Integer; 2	01: A 04: D65 07: F7 10: F11	02: C 05: F2 08: F8 11: F12	03: D50 06: F6 09: F10
4	Illuminant 1	Integer; 2	01: X 04: x 06: L* 09: C* 11: Hunter L 14: Munsell Hu	ue (2° Observer,	03: Z 08: b* 13: Hunter b Illuminant C)*1
			15: Munsell Value (2° Observer, Illuminant C)*1 16: Munsell Chroma (2° Observer, Illuminant C)*1		
			parentheses	are used regardle	ettings indicated in ess of the settings for server and [3] Illuminant.

Response Parameters

	•					
	Meaning	Type; No. of characters	Details/range			
1	Colorimetric value	Character; 8				

Explanation

Reads the colorimetric measurement data calculated by the instrument immediately after a measurement is taken using MES.

If data for the requested SCI/SCE mode is not available (for example, if measurement was taken in SCI mode and SCE data is requested using this command), ER10 will be output.

Please see Appendix A for the flow of operations for measurement.

Error-check codes

Code	Meaning	
OK00	Command was processed normally.	
OK03	Battery power of instrument is getting low.	
ER00	Invalid command string received.	
ER02	Battery power is too low for measurements.	
ER03	Input parameter error	

ER05	Xenon lamp flash error
ER10	No data present.
ER13	A/D conversion error
ER27	Charge circuit error



SW	S (Measuring <u>Sw</u> itch S	tatus <u>S</u> et)		
Fur	nction			
E	Enables/disables instrument's	measuring bu	tton when the instr	ument is in communication mode.
Inp	ut/Output Format			
"SW	S,1" + Delimiter code	2	\Rightarrow	
				r-check code" + Delimiter
Coi	mmand Parameters			
	Meaning	Type; No. of characters	Details/range	
1	Measuring enable/disable status	Integer; 1	0: Disable	1: Enable
Res	sponse Parameters			
	Meaning	Type; No. of characters	Details/range	
Exp	lanation		-	
r G	Fo take measurements in come nable the measuring button. Once the measuring button ha	o take measur nmunication mo as been enable	rements while the ir ode using the meas ed, taking a measur	measuring button allows the nstrument is in communication mode. suring button, it is necessary to

Once the measuring button has been enabled, taking a measurement with either the measuring button or by sending the command MES to the instrument from the PC will disable the measuring button. To take continued measurements, the measuring button must be enabled after each measurement has been completed.

When the measuring button is pressed to take a measurement, the instrument's buffer is immediately cleared to prepare to receive the new measurement data.

Error-cl	Error-check codes		
Code	Meaning		
OK00	Command was processed normally		
OK03	Battery power of instrument is getting low.		
ER00	Invalid command string received.		
ER02	Battery power is too low for measurements.		
ER03	Input parameter error		

RDR (Remote Measurement Data Read)

Function

Reads spectral measurement data in instrument buffer for measurement taken using the instrument's measuring button.

After data read has been completed, the read data is cleared from the instrument buffer.

• This command can be used only with instruments having ROM version 1.14 or higher.

Input/Output Format

 $\Leftrightarrow \frac{\text{"Error-check code},[1],[2],[3]...}{29,[30],[31]" + Delimiter code}$

Command Parameters

	Meaning	Type; No. of characters	Details/range
1	Data check; SCI/SCE mode	Integer; 1	0: Check for data 1: SCI 2: SCE

Response Parameters

1	toopenee i arametere			
	Meaning	Type; No. of characters	Details/range	
1	Measured reflectance (400nm)	Integer; 6	000000 to 020000 (100x actual value: 0.00 to 200.00)	
31	Measured reflectance (700nm)	Integer; 6	000000 to 020000 (100x actual value: 0.00 to 200.00)	

Explanation

Reads the measurement data held in the instrument's buffer immediately after a measurement is taken using the instrument's measuring button.

The procedure is to send RDR with parameter [1] set to 0 repeatedly to check whether data is present. When this returns OK00, data is present and can be read by setting parameter [1] to 1 or 2 to read SCI or SCE data respectively.

After data read has been completed, the read data is cleared from the instrument buffer. (For example, if instrument is set to measure both SCI and SCE, and after a measurement the SCI data are read, only the SCI data will be cleared from the buffer. The SCE data will remain in the buffer until read or until the next measurement is taken.)

If data for the requested SCI/SCE mode is not available (for example, if measurement was taken in SCI mode and SCE data is requested using this command), ER10 will be output.

ER10 will also be output when no data is present and instrument is idle. If the instrument is in the process of taking a measurement, ER35 will be output instead.

Please see Appendix A for the flow of operations for measurement.

Error-check codes

Code	Meaning	
OK00	Command was processed normally.	
OK03	attery power of instrument is getting low.	
ER00	nvalid command string received.	
ER02	Battery power is too low for measurements.	
ER03	Input parameter error	
ER05	Xenon lamp flash error	
ER10	No data present.	

ER13	A/D conversion error
ER27	Charge circuit error
ER35	Measurement in process



RCR ("Trigger Measurement Color Data Read")

Function

Reads colorimetric measurement data calculated by the instrument for measurement taken using the instrument's measuring button.

• This command can be used only with instruments having ROM version 1.14 or higher.

Input/Output Format

"RCR,1,2,3,4" + Delimiter code

□

" Error-check code ,1"

Delimiter code

 \Diamond

Command Parameters

	Meaning	Type; No. of characters	Details/range		
1	SCI/SCE mode	Integer; 1	1: SCI	2: SCE	
2	Observer	Integer; 1	1: 2°	2: 10°	
3	Illuminant 1	Integer; 2	01: A 04: D65 07: F7 10: F11	02: C 05: F2 08: F8 11: F12	03: D50 06: F6 09: F10
4	Illuminant 1	Integer; 2	01: X 04: X 06: L* 09: C*	02: Y 05: y 07: a* 10: h	03: Z 08: b*
			14: Munsell Hu 15: Munsell Va		13: Hunter b Illuminant C) ^{*1} er, Illuminant C) ^{*1} er, Illuminant C) ^{*1} er, Illuminant C) ^{*1}
			parentheses	are used regardle	ettings indicated in ess of the settings for server and [3] Illuminant.

Response Parameters

	Meaning	Type; No. of characters	Details/range
1	Colorimetric value	Character; 8	

Explanation

Reads the colorimetric measurement data calculated by the instrument immediately after a measurement is taken using MES.

If data for the requested SCI/SCE mode is not available (for example, if measurement was taken in SCI mode and SCE data is requested using this command), ER10 will be output.

 If spectral measurement data will also be read using the RDR command, the RCR command should be used first. When the RDR command is used, the spectral measurement data (which are used to calculate the colorimetric data) for the read status will be cleared from the instrument buffer after the data has been sent by the instrument.

Please see Appendix A for the flow of operations for measurement.

Error-check codes

Code	Meaning	
OK00	Command was processed normally.	
OK03	Battery power of instrument is getting low.	

ER00	Invalid command string received.
ER02	Battery power is too low for measurements.
ER03	Input parameter error
ER05	Xenon lamp flash error
ER10	No data present.
ER13	A/D conversion error
ER27	Charge circuit error
ER35	Measurement in process



2.2.6 Measurement values

SPR (Sample Data Parameter Read) Function	2.2.	2.2.6 Measurement values					
Reads the measurement parameters of the specified data stored in the instrument. Input/Output Format	SPR	R (<u>S</u> ample Data <u>P</u> arame	eter <u>R</u> ead)				
Input/Output Format "SPR, " + Delimiter code	Fun	ction					
SPR, ☐ + Delimiter code Spr. ☐ + Delimiter code □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	R	eads the measurement para	meters of the	specified data stored in the instrument.			
Command Parameters Meaning Type; No. of characters Details/range	Inpu	ut/Output Format					
Command Parameters Meaning Type; No. of characters Details/range	"SPR	R,I" + Delimiter code	9	⇒			
Meaning		←					
Characters Cha	Con	nmand Parameters					
Response Parameters Meaning Type; No. of characters Details/range [2] Measurement area Integer; 1 1: SAV (CM-700d only) 2: MAV [2] SCI/SCE mode Integer; 1 1: SCI 2: SCE 3: SCI + SCE [3] Related target number Integer; 5 00001 to 01000 [4] Year of measurement Integer; 4 2000 to 2050 [5] Month of measurement Integer; 2 01 to 12 [6] Day of measurement Integer; 2 01 to 31 (Depending on month) [7] Hour of measurement Integer; 2 00 to 23 (24-hour clock) [8] Minute of measurement Integer; 2 00 to 59 [9] Second of measurement Integer; 1 0: Standard [10] Standard/Custom Integer; 1 0: Standard [11] Name (comment) Character;		Meaning		Details/range			
Meaning Type; No. of characters Details/range	1	Sample data number	Integer; 5	00001 to 04000			
Characters Characters Measurement area Integer; 1 1: SAV (CM-700d only) 2: MAV SCI/SCE mode Integer; 1 1: SCI 2; SCE 3: SCI + SCE Related target number Integer; 5 00001 to 01000 Year of measurement Integer; 4 2000 to 2050 Month of measurement Integer; 2 01 to 12 Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	Res	ponse Parameters					
SCI/SCE mode Integer; 1 1: SCI 2: SCE 3: SCI + SCE Related target number Integer; 5 00001 to 01000 Year of measurement Integer; 4 2000 to 2050 Month of measurement Integer; 2 01 to 12 Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;		Meaning		Details/range			
Related target number Integer; 5 00001 to 01000 Year of measurement Integer; 4 2000 to 2050 Month of measurement Integer; 2 01 to 12 Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	1	Measurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV			
Year of measurement Integer; 4 2000 to 2050 Month of measurement Integer; 2 01 to 12 Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	2	SCI/SCE mode	Integer; 1	1: SCI 2; SCE 3: SCI + SCE			
Month of measurement Integer; 2 01 to 12 Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	3	Related target number	Integer; 5	00001 to 01000			
Day of measurement Integer; 2 01 to 31 (Depending on month) Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	4	Year of measurement	Integer; 4	2000 to 2050			
Hour of measurement Integer; 2 00 to 23 (24-hour clock) Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	5	Month of measurement	Integer; 2	01 to 12			
Minute of measurement Integer; 2 00 to 59 Second of measurement Integer; 2 00 to 59 Standard/Custom Integer; 1 0: Standard 1: Custom Name (comment) Character;	6	Day of measurement	Integer; 2	01 to 31 (Depending on month)			
Second of measurement Integer; 2 00 to 59 10	7	Hour of measurement	Integer; 2	00 to 23 (24-hour clock)			
Integer; 1	8	Minute of measurement	Integer; 2	00 to 59			
1: Custom 12	9	Second of measurement	Integer; 2	00 to 59			
	10	Standard/Custom	Integer; 1				
	11	Name (comment)					

Explanation

Reads the measurement parameters of the specified data number stored in the instrument: Measurement area, SCI/SCE mode, related target number, date/time of measurement, and name (comment).

The reflectance data for measurement are read using a different command: SDR.

Error-cl	Error-check codes		
Code	Meaning		
OK00	Command was processed normally		
OK03	Battery power of instrument is getting low.		
ER00	Invalid command string received.		
ER02	Battery power is too low for measurements.		

ER03	Input parameter error
ER10	No data present.



SDR (SDR (<u>S</u> ample <u>D</u> ata <u>R</u> ead)					
Funct	Function					
Rea	Reads the measurement data of the specified data number stored in the instrument.					
Input	/Output Format					
"SDR,	1,2" + Delimiter co	ode	\Rightarrow			
Comr	mand Parameters					
ľ	Meaning	Type; No. of characters	Details/range			
[] \$	Sample data number	Integer; 5	00001 to 04000			
[2]	SCI/SCE mode	Integer; 1	1: SCI 2: SCE			
Resp	onse Parameters					
ı	Meaning	Type; No. of characters	Details/range			
1 1 1 1 1	Measured reflectance (400nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)			
!!	Measured reflectance (700nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)			
Expla	nation					
If da SCI	Reads the measurement data of the specified data number stored in the instrument. If data for the requested SCI/SCE mode is not available (for example, if measurement was taken in SCI mode and SCE data is requested using this command), ER10 will be output. The measurement parameters for the data are read using a different command: SPR.					
Error	-check codes					
Code	e Meaning					
OK00	Command was proces	ssed normally.				
OK03	OK03 Battery power of instrument is getting low.		g low.			
ER00	Invalid command strin	g received.				
ER02	Battery power is too lo	w for measure	ements.			
ER03	Input parameter error					
ER10	No data present.	No data present.				

SDD (S	SDD (<u>S</u> ample <u>D</u> ata <u>D</u> elete)					
Function	Function					
Delet	es the measurement data	a for the specif	ied data number stored in the instrument.			
Input/C	Output Format					
"SDD,1	" + Delimiter code		\Rightarrow			
Comm	and Parameters					
Me	eaning	Type; No. of characters	Details/range			
II Sa	ample data number	Integer; 5	00001 to 0xxxx (xxxx = Number of measurements in memory; Maximum: 4000)			
Respo	Response Parameters					
Me	Meaning Type; No. of characters		Details/range			
Explan	ation					
The rusing	Deletes the measurement data for the specified data number stored in the instrument. The maximum sample data number that can be specified is equal to the sample data count obtained using STR. Error-check codes					
Code	Meaning					
OK 0 0		Command was processed normally.				
OK03	Battery power of instrument is getting low.					
ER00	Invalid command strin		J ·-···			
ER02		Battery power is too low for measurements.				
ER03	Input parameter error					
ER10	No data present.	No data present.				

SAD (S	SAD (<u>S</u> ample Data <u>A</u> ll <u>D</u> elete)					
Functio	Function					
Delete	Deletes all measurement data stored in the instrument.					
Input/O	utput Format					
"SAD" +	Delimiter code		\Rightarrow			
			⇔ <u>"Error-</u>	check code " + Delimiter		
Comma	nd Parameters		•			
Mea	Type; No. of characters Details/range					
Respon	se Parameters					
Me	aning	Type; No. of characters	Details/range			
Explana	Explanation					
The tir	Deletes all measurement data stored in the instrument. The time required to complete this procedure varies according to the number of stored data, but a timeout of 3 seconds or longer is sufficient.					
Error-cl	Error-check codes					
Code	Meaning					
OK00	Command was proces	ssed normally.				
OK03	Battery power of instrument is getting low.					
ER00	Invalid command string received.					
ER02	Battery power is too low for measurements.					

2.2.7 Target color

TNR	TNR (<u>T</u> arget <u>N</u> umber <u>R</u> ead)					
Fun	ctio	n				
R	eads	the active target number	er set on the in	strument.		
Inpu	ut/Ou	utput Format				
"TNR	2" +	Delimiter code		\Rightarrow		
				<pre></pre>		
Con	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
Res	pon	se Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Tar	get number	Integer; 5	00001 to 01000		
Exp	lana	tion				
R	eads	the active target number	er set on the in	strument.		
Erro	or-ch	neck codes				
Co	de	Meaning				
OK00)	Command was proces	ssed normally			
OK03	3	Battery power of instru	ument is gettin	g low.		
ER00)	Invalid command strin	g received.			
ER02	2	Battery power is too lo	ow for measure	ements.		

TNS	TNS (<u>T</u> arget <u>N</u> umber <u>S</u> et)					
Fund	Function					
Se	ets th	e active target number	on the instrum	ent.		
Inpu	t/Oı	utput Format				
"TNS	, 1 "	+ Delimiter code	•	\Rightarrow		
Com	mai	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Taro	get number	Integer; 5	00001 to 01000		
Resp	oons	se Parameters				
	Meaning Type; No. of characters		Type; No. of characters	Details/range		
Expl	ana	tion				
ins	Sets the active target number on the instrument. Subsequent measurements taken with the instrument in standalone mode (not connected to a computer) will have this target number as the related target number.					
Erro	r-ch	eck codes				
Coc	de	Meaning				
OK00		Command was proces	ssed normally	,		
OK03		Battery power of instru	ıment is gettin	g low.		
ER00		Invalid command strin	g received.			
ER02		Battery power is too low for measurements.				
ER03		Input parameter error				

TPE	R (<u>T</u> arget Data <u>P</u> arame	ter Read)				
	ction	iei <u>it</u> eau)				
	Reads the measurement parameters of the specified target data stored in the instrument.					
	Input/Output Format					
	"TPR, I " + Delimiter code □					
						
	™ Error-check code ,[1,2,3,4,5,6,					
			7,8,9,10,11" + Delimiter code			
Con	nmand Parameters					
	Meaning	Type; No. of characters	Details/range			
1	Target data number	Integer; 5	00001 to 01000			
Res	ponse Parameters					
	Meaning	Type; No. of characters	Details/range			
1	Measurement area	Integer; 1	1: SAV (CM-700d only) 2: MAV			
2	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE			
3	Data type	Integer; 1	0: Spectral reflectance 1: Colorimetric			
4	Year of measurement	Integer; 4	2000 to 2050			
5	Month of measurement	Integer; 2	01 to 12			
6	Day of measurement	Integer; 2	01 to 31 (Depending on month)			
7	Hour of measurement	Integer; 2	00 to 23 (24-hour clock)			
8	Minute of measurement	Integer; 2	00 to 59			
9	Second of measurement	Integer; 2	00 to 59			
10	Standard/Custom	Integer; 1	0: Standard 1: Custom			
11	Name (comment)	Character; 11				
Ехр	lanation					
Ν	leasurement area, SCI/SCE	mode, data typ	specific target data number stored in the instrument: pe, date/time of measurement, and name (comment).			
	he target data for measurem or-check codes	ent are read u	sing a different command: TDR.			
	Code Meaning OK 0 0 Command was processed normally					
OK03 Battery power of instrument is getting low.			g low.			
ER00						
ER02		Battery power is too low for measurements.				
ER03						
ER10	No data present.					

TDR	TDR (<u>T</u> arget <u>D</u> ata <u>R</u> ead)					
Fun	ction					
R	eads the target data of the sp	pecified target	number stored in the instrument.			
Inpu	Input/Output Format					
"TDR	1,1,2" + Delimiter co	ode	⇒			
(For s	spectral target data)					
(For	colorimetric target data)					
Con	nmand Parameters					
	Meaning	Type; No. of characters	Details/range			
1	Target data number	Integer; 5	00001 to 01000			
1	SCI/SCE mode	Integer; 1	1: SCI 2: SCE			
Res	ponse Parameters					
	Meaning	Type; No. of characters	Details/range			
(For	spectral target data)					
1	Measured reflectance (400nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)			
31	Measured reflectance (700nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)			
(For	colorimetric target data)					
1	Color space setting at time data was set	Integer; 1	1: L*a*b* 3: Hunter Lab 5: XYZ			
2	First colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100× actual value)			
3	Second colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100× actual value)			
4	Third colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100× actual value)			
5	First colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)			
6	Second colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)			
7	Third colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)			
8	Observer	Integer; 1	1: 2° 2: 10°			
9	Illuminant 1	Integer; 2	1: A 2: C 3: D50 4: D65 5: F2 6: F6 7: F7 8: F8 9: F10 10: F11 11: F12			

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

10	Illuminant 2	Integer; 2	1: A 4: D65 7: F7 10: F11	2: C 5: F2 8: F8 11: F12	3: D50 6: F6 9: F10 00: None

Explanation

Reads the target data of the specified target data number stored in the instrument.

Either spectral data or colorimetric data (not both for the same target number) can be set as the target data.

If data for the requested SCI/SCE mode is not available (for example, if only SCI data are stored and SCE data is requested using this command), ER10 will be output.

The measurement parameters for the data are read using a different command: TPR.

Error-cl	Error-check codes					
Code	Meaning					
OK00	Command was processed normally.					
OK03	Battery power of instrument is getting low.					
ER00	Invalid command string received.					
ER02	Battery power is too low for measurements.					
ER03	Input parameter error					
ER10	No data present.					

TDS (<u>Target Data Set</u>)					
Function					
Sets target data in the instrum	ent.				
Input/Output Format					
"TDS,1,[],[],[],[],[],[],[],[],[],[],[],[],[],	9,10,11" +	⇒			
		\(\rightarrow	"Error-check code" + Delimiter		
(For spectral target data "TDS,2,20,21,22,,49,5		⇔			
		⇔	" Error-check code" + Delimiter code		
(For colorimetric target data) "TDS,2,20,21,22,23,24,25,26,27, 28,29" + Delimiter code		⇔			
		\(\pi	" Error-check code" + Delimiter code		
(When setting both SCI and SCE data)					
(For spectral target data "TDS,3,20,21,22,,49,5		⇔			
		\(\rightarrow	" Error-check code" + Delimiter code		
(for colorimetric target "TDS,3,20,21,22,23,24,25,28,29" + Delimiter code	,[26],[27],	⇒			
			" Error-check code" + Delimiter code		
Command Parameters					
Meaning	Type; No. of characters	Details/range			
Target data number	Integer; 5	00001 to 01000			
Measurement area	Integer; 1	1: SAV	(CM-700d only) 2: MAV		

3	SCI/SCE mode	Integer; 1	1: SCI 2: SCE 3: SCI + SCE
4	Data type	Integer; 1	0: Spectral reflectance 1: Colorimetric
5	Year	Integer; 4	2000 to 2050
6	Month	Integer; 2	01 to 12
7	Day	Integer; 2	01 to 31 (Depending on month)
8	Hour	Integer; 2	00 to 23 (24-hour clock)
9	Minute	Integer; 2	00 to 59
10	Second	Integer; 2	00 to 59
11	Name (comment)	Character;	
(For	spectral target data)		
20	Spectral reflectance (400nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)
51	Spectral reflectance (700nm)	Integer; 6	000000 to 020000 (100× actual value: 0.00 to 200.00)
(For	colorimetric target data)		
20	Color space setting	Integer; 1	1: L*a*b* 3: Hunter Lab 5: XYZ
21	First colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100x actual value)
22	Second colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100x actual value)
23	Third colorimetric value under Illuminant 1	Integer; 6	Range varies depending on color space (100x actual value)
24	First colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)
25	Second colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)
26	Third colorimetric value under Illuminant 2	Integer; 6	Range varies depending on color space (100x actual value)
27	Observer	Integer; 1	1: 2° 2: 10°
28	Illuminant 1	Integer; 2	1: A 2: C 3: D50 4: D65 5: F2 6: F6 7: F7 8: F8 9: F10 10: F11 11: F12
29	Illuminant 2	Integer; 2	1: A 2: C 3: D50 4: D65 5: F2 6: F6 7: F7 8: F8 9: F10 10: F11 11: F12 00: None
Res	ponse Parameters		
	Meaning	Type; No. of characters	Details/range
	1	1	1

Explanation

Sets the target data of the specified target data number in the instrument.

To set data for a target, at a minimum "TDS,1" (target parameters) and "TDS,2" (target data) sets of data must be set. To set both SCI and SCE target data, "TDS,1" (target parameters), "TDS,2" (SCI target data), and "TDS,3" (SCE target data) must be set.

The sets of data ("TDS,1" + "TDS,2" or "TDS,1" + "TDS,2" + "TDS,3") for this command must be set in sequence without interruption. If a different command is input before the sequence has been completed (for example, if a different command is input between the sets of data for "TDS,1" and "TDS,2"), the input data will be invalid and the target will not be stored.

When inputting colorimetric data, if no data will be set for Illuminant 2, set the values to "0". In addition, when inputting colorimetric data for SCI and SCE, the Color space, Observer, Illuminant 1, and Illuminant 2 must be set to the same setting for both SCI and SCE. If different settings are set, the last setting will overwrite the earlier setting.

Error-c	Error-check codes					
Code	Meaning					
OK00	Command was processed normally.					
OK03	Battery power of instrument is getting low.					
ER00	Invalid command string received.					
ER02	Battery power is too low for measurements.					
ER03	Input parameter error					
ER69	Target data protection status is on.					

TTD (Use <u>Target Tolerance Default Values</u>)

Function

Sets the tolerance values for the specified target data stored in the instrument to the values of the specified default registration.

Input/Output Format

Command Parameters

	Meaning	Type; No. of characters	Details/range
1	Target data number	Integer; 5	00001 to 01000
2	Default tolerance registration number	Integer; 2	00: No registration (no tolerance data) 01 to 08:Default tolerance registration to copy from

Response Parameters

Meaning	Type; No. of characters	Details/range

Explanation

Sets the tolerance values for the specified target data number to the tolerance values stored in the specified default tolerance registration number.

If 00 is set as the default tolerance registration number, the tolerance values for the specified target data number are set to "None".

If 01 to 08 is set as the default tolerance registration number, the tolerance values stored in that default tolerance registration number are copied and set as the tolerances for the specified target number.

If there are no data in the specified target data number, the response will be ER10.

Error-check codes

	End dicok dodos		
Code	Meaning		
OK00	Command was processed normally.		
OK03	Battery power of instrument is getting low.		
ER00	Invalid command string received.		
ER02	Battery power is too low for measurements.		
ER03	Input parameter error		
ER10	No data present.		
ER69	Target data protection status is on.		

TTR	(<u>T</u> arget <u>T</u> olerance Va	lues <u>R</u> ead)			
	ction				
R	eads the tolerance values of	the specified t	target nu	mber stored in th	e instrument.
Inpu	ut/Output Format				
"TTF	R,1,2" + Delimiter co	ode	\Rightarrow		
	$\Leftrightarrow \frac{\text{``Error-check code}}{47,48}\text{'' + Delimiter code}$				
Con	nmand Parameters		-		
	Meaning	Type; No. of characters	Details	/range	
1	Target data number	Integer; 5	00001	to 01000	
2	SCI/SCE mode	Integer; 1	1: SCI		2: SCE
Res	ponse Parameters				
	Meaning	Type; No. of characters	Details	/range	
1	Tolerance type	Integer; 1	0 (Star	ndard value)	
(Para	ametric coefficients)				
2	(CMC) I	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
3	(CMC) c	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
4	(ΔΕ*94) Ι	Integer; 3	001 to	999 (100× actua	ıl value: 0.01 to 9.99)
5	(ΔE*94) c	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
6	(ΔE*94) h	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
7	(ΔE2000) I	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
8	(ΔE2000) c	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
9	(ΔE2000) h	Integer; 3	001 to	999 (100× actua	l value: 0.01 to 9.99)
(Tole	rance values)		1		
10	Color space	Integer; 2	01: L*a 03: Hu 05: XY	nter Lab	02: L*C*h 04: Yxy 06: Munsell
11	Color-difference equation	Integer; 2		* (1976) * (1994)	02: CMC (I:c) 04: ΔΕ* (2000)
12	Index	Integer; 2	03: YI	(ASTM E313-73) 02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss
13	Enable/disable +∆A tolerance value under Illuminant 1	Integer; 1	0: Disa	ble	1: Enable
14	+ ΔA tolerance value under Illuminant 1	Integer; 3	001 to	200 (10× actual	value: 0.1 to 20.0)

15	Enable/disable -∆A tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
16	-∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
17	Enable/disable +∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
18	+ ΔB tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
19	Enable/disable -∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
20	-∆B tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
21	Enable/disable +∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
22	+ ΔC tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
23	Enable/disable -∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
24	-∆C tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
25	Enable/disable ΔE tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
26	ΔE tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
27	Enable/disable +∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
28	+ ΔIndex tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
29	Enable/disable -∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
30	-∆Index tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
31	Enable/disable +ΔA tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
32	+ ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
33	Enable/disable -ΔA tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
34	-∆A tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
35	Enable/disable +∆B tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
36	+ ∆B tolerance value	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)

	under Illuminant 2		
37	Enable/disable -∆B tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
38	-ΔB tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
39	Enable/disable +ΔC tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
40	+ ΔC tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
41	Enable/disable -∆C tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
42	-ΔC tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
43	Enable/disable ΔE tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
44	ΔE tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
45	Enable/disable +∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
46	+ \(\Delta \text{Index tolerance value} \) under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
47	Enable/disable -∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
48	-∆Index tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)

Explanation

Reads the tolerance parameters and values set for the specified target number. [10] above (Color space) determines the meanings of A, B, and C in [13] through [24] and [31]

through [42]: A is the first variable of the color space, B is the second, and C is the third. For example, if [10] is set to "1" (L*a*b*), then A=L*, B=a*, and C=b*. If [10] is set to "6" (Munsell), tolerances for A, B, and C are ignored.

[11] determines the meaning of E in [25], [26], [43] and [44].

[12] determines the meaning of Index in [27] to [30] and [45] to [48].

Error-ch	Error-check codes		
Code	Code Meaning		
OK00	Command was processed normally.		
OK03	Battery power of instrument is getting low.		
ER00	Invalid command string received.		
ER02	Battery power is too low for measurements.		
ER03	Input parameter error		
ER10	No data present.		

TTS	(<u>T</u> arget <u>T</u> olerance Va	lues <u>S</u> et)		
Fun	ction	-		
S	ets the tolerance values of th	e specified tar	get number stored in the i	nstrument.
-	ut/Output Format			
	3, [1, [2[1], [12 [49], [5	0" +	⇒	
Del:	imiter code			
			⇔ "Error-chec	k code " + Delimiter
Con	nmand Parameters			
	Meaning	Type; No. of characters	Details/range	
1	Target data number	Integer; 5	00001 to 01000	
2	SCI/SCE mode	Integer; 1	1: SCI	2: SCE
3	Tolerance type	Integer; 1	0 (Standard value)	
_	ametric coefficients)			
4	(CMC) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
5	(CMC) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
6	(∆E*94) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
7	(ΔE*94) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
8	(ΔE*94) h	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
9	(ΔE2000) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
10	(ΔE2000) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
11	(∆E2000) h	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)
	erance values)	ı		
12	Color space	Integer; 2	01: L*a*b* 03: Hunter Lab 05: XYZ	02: L*C*h 04: Yxy 06: Munsell
13	Color-difference equation	Integer; 2	01: ΔE* (1976) 03: ΔE* (1994)	02: CMC (I:c) 04: ΔE* (2000)
14	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 03: YI (ASTM E313-73) 05: ISO Brightness	02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss
15	Enable/disable +∆A tolerance value under Illuminant 1	Integer; 1	0: Disable	1: Enable
16	+ ΔA tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual v	value: 0.1 to 20.0)
17	Enable/disable -∆A tolerance value under	Integer; 1	0: Disable	1: Enable

	Illuminant 1		
18	-∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
19	Enable/disable +∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
20	+ ΔB tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
21	Enable/disable -∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
22	-∆B tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
23	Enable/disable +∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
24	+ ΔC tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
25	Enable/disable -∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
26	-∆C tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
27	Enable/disable ∆E tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
28	ΔE tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
29	Enable/disable +∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
30	+ ΔIndex tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
31	Enable/disable -∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
32	-∆Index tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
33	Enable/disable +ΔA tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
34	+ ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
35	Enable/disable -∆A tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
36	- ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
37	Enable/disable +ΔB tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
38	+ ΔB tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)

Enable/disable -ΔB tolerance value under Illuminant 2 4.0 -AB tolerance value under Illuminant 2 4.1 Enable/disable +ΔC tolerance value under Illuminant 2 4.2 Enable/disable +ΔC tolerance value under Illuminant 2 4.3 Enable/disable -ΔC tolerance value under Illuminant 2 4.4 ΔC tolerance value under Illuminant 2 4.5 Enable/disable -ΔC tolerance value under Illuminant 2 4.6 Enable/disable -ΔC tolerance value under Illuminant 2 4.6 -ΔC tolerance value under Illuminant 2 4.7 Enable/disable -ΔC tolerance value under Illuminant 2 4.8 Enable/disable ΔE tolerance value under Illuminant 2 4.9 -ΔC tolerance value under Illuminant 2 4.0 Enable/disable ΔE tolerance value under Illuminant 2 4.1 Enable/disable -ΔI Integer; 1 4.2 Enable/disable +ΔIndex tolerance value under Illuminant 2 4.2 Enable/disable +ΔIndex tolerance value under Illuminant 2 4.3 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.4 Londex tolerance value under Illuminant 2 4.5 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.6 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.7 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.8 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.9 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.0 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.1 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.2 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.2 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.2 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.3 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.4 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.5 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.6 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.7 Enable tolerance value under Illuminant 2 4.8 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.8 Enable/disable -ΔIndex tolerance value under Illuminant 2 4.9 Enable/disable				
Illuminant 2	39	tolerance value under	Integer; 1	0: Disable 1: Enable
tolerance value under Illuminant 2 + \(\Delta \C \) tolerance value under Illuminant 2 Enable/disable - \(\Delta \C \) tolerance value under Illuminant 2 - \(\Delta \C \) tolerance value under Illuminant 2 - \(\Delta \C \) tolerance value under Illuminant 2 - \(\Delta \C \) tolerance value under Illuminant 2 Enable/disable \(\Delta \E \) tolerance value under Illuminant 2 - \(\Delta \E \) tolerance value under Illuminant 2	40		Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
under Illuminant 2 Linteger; 1 0: Disable 1: Enable 143 Enable/disable -ΔC tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 145 Enable/disable ΔE tolerance value under Illuminant 2 Integer; 1 0: Disable 1: Enable 146 ΔE tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 147 Enable/disable +ΔIndex tolerance value under Illuminant 2 Integer; 1 0: Disable 1: Enable 148 + ΔIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 149 Enable/disable -ΔIndex tolerance value under Illuminant 2 Integer; 1 0: Disable 1: Enable 150 -ΔIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 150 -ΔIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 150 -ΔIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 150 -ΔIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) 150 -ΔIndex tolerance value under Illumina	41	tolerance value under	Integer; 1	0: Disable 1: Enable
tolerance value under Illuminant 2	42		Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
under Illuminant 2 Enable/disable ΔE tolerance value under Illuminant 2 ΔE tolerance value under Illuminant 2 ΔE tolerance value under Illuminant 2 Enable/disable +ΔIndex tolerance value under Illuminant 2 Integer; 1 C: Disable 1: Enable 1	43	tolerance value under	Integer; 1	0: Disable 1: Enable
tolerance value under Illuminant 2 AE tolerance value under Illuminant 2 AE tolerance value under Illuminant 2 Enable/disable +\Delta Index tolerance value under Illuminant 2 AI	44		Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
Illuminant 2	45	tolerance value under	Integer; 1	0: Disable 1: Enable
tolerance value under Illuminant 2 + \(\Delta\) Integer; 3 current tolerance value under value under Illuminant 2 Enable/disable -\(\Delta\) Integer; 1 Enable/disable -\(\Delta\) Integer; 1 current tolerance value under Illuminant 2 -\(\Delta\) Integer; 3 current tolerance value under Illuminant 2 -\(\Delta\) Integer; 3 current tolerance value under Illuminant 2 Response Parameters Meaning Type; No. of Details/range	46		Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
under Illuminant 2 Enable/disable -ΔIndex tolerance value under Illuminant 2 □ ΔIndex tolerance value under under Illuminant 2 □ ΔIndex tolerance value under Illuminant 2 Response Parameters Meaning Type; No. of Details/range	47	tolerance value under	Integer; 1	0: Disable 1: Enable
tolerance value under Illuminant 2 -AIndex tolerance value under Illuminant 2 Integer; 3 001 to 200 (10x actual value: 0.1 to 20.0) Response Parameters Meaning Type; No. of Details/range	48		Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
under Illuminant 2 Response Parameters Meaning Type; No. of Details/range	49	tolerance value under	Integer; 1	0: Disable 1: Enable
Meaning Type; No. of Details/range	50		Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
	Res	ponse Parameters		
		Meaning		Details/range

Explanation

Sets the tolerance parameters and values set for the specified target number.

[12] above (Color space) determines the meanings of A, B, and C in [15] through [26] and [33] through [44]: A is the first variable of the color space, B is the second, and C is the third. For example, if [12] is set to "1" (L*a*b*), then A=L*, B=a*, and C=b*. If [12] is set to "6" (Munsell), tolerances for A, B, and C should be disabled.

[13] determines the meaning of E in [27], [28], [45] and [46].

[14] determines the meaning of Index in [29] to [32] and [47] to [50]. Tolerance data can be set for any target number for which target data exists.

Settings for [12] Color Space, [13] Color difference equation, and [14] Index should be set to the same setting for SCI and SCE. If different settings are set, the SCE setting will take priority and be used for SCI also.

Error-ch	Error-check codes		
Code	Meaning		
OK00	Command was processed normally.		
OK03	Battery power of instrument is getting low.		
ER00	Invalid command string received.		
ER02	Battery power is too low for measurements.		
ER03	Input parameter error		

	I
ER69	Target data protection status is on.

TDD (<u>T</u> arget <u>D</u> ata <u>D</u> elete)							
Function							
Deletes the data for the specified target data number stored in the instrument.							
Input/Output Format							
"TDD, I" + Delimiter code							
Command Parameters							
	Meaning	Type; No. of characters	Details/range				
1	Target data number	Integer; 5	00001 to 1000				
Response Parameters							
	Meaning	Type; No. of characters	Details/range				
Explanation							
Deletes the data for the specific target data number stored in the instrument. If data does not exist for the specified target data number, ER10 will be output.							
Error-check codes							
Code	Code Meaning						
OK00	Command was proces	Command was processed normally.					
OK03	Battery power of instru	Battery power of instrument is getting low.					
ER00	Invalid command strin	Invalid command string received.					
ER02	Battery power is too lo	Battery power is too low for measurements.					
ER03	Input parameter error	Input parameter error					
ER10	No data present.	No data present.					
ER69	Target data protection	Target data protection status is on.					

TAD (<u>T</u> arget Data <u>A</u> ll <u>D</u> elete)							
Function							
Deletes all target data stored in the instrument.							
Input/Output Format							
"TAD" + Delimiter code			\Rightarrow				
			\(\rightarrow	" Error-check code " + Delimiter code			
Command Parameters							
Me	eaning	Type; No. of characters	Details/range				
Respon	nse Parameters						
Meaning		Type; No. of characters	Details/range				
Explanation							
Deletes all target data stored in the instrument. The time required to complete this procedure varies according to the number of stored data, but a timeout of 3 seconds or longer is sufficient.							
Error-check codes							
Code	Meaning						
OK00	Command was processed normally.						
OK03	Battery power of instrument is getting low.						
ER00	Invalid command string received.						
ER02	Battery power is too low for measurements.						
ER69	Target data protection status is on.						

TOF	TOR (Default <u>To</u> lerance Values <u>R</u> ead)				
	Function				
_	Reads the tolerance values of the specified default tolerance registration number stored in the instrument.				
Inpu	ut/Output Format				
"TOF	R,1,2" + Delimiter co	ode	\Rightarrow		
			<□	ck code ,[]9,[10]	
Con	nmand Parameters				
	Meaning	Type; No. of characters	Details/range		
1	Default tolerance registration number	Integer; 2	01 to 08		
2	SCI/SCE mode	Integer; 1	1: SCI	2: SCE	
Res	ponse Parameters				
	Meaning	Type; No. of characters	Details/range		
1	Tolerance type	Integer; 1	0 (Standard value)		
(Para	ametric coefficients)				
2	(CMC) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
3	(CMC) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
4	(ΔE*94) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
5	(ΔE*94) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
6	(ΔE*94) h	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
7	(ΔE2000) I	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
8	(ΔE2000) c	Integer; 3	001 to 999 (100× actual	value: 0.01 to 9.99)	
9	(ΔE2000) h	Integer; 3	001 to 999 (100× actual	l value: 0.01 to 9.99)	
(Tole	rance values)				
10	Color space	Integer; 2	01: L*a*b* 03: Hunter Lab 05: XYZ	02: L*C*h 04: Yxy 06: Munsell	
11	Color-difference equation	Integer; 2	01: ΔE* (1976) 03: ΔE* (1994)	02: CMC (l:c) 04: ΔE* (2000)	
12	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 03: YI (ASTM E313-73) 05: ISO Brightness	02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss	
13	Enable/disable +ΔA tolerance value under Illuminant 1	Integer; 1	0: Disable	1: Enable	

_	1		
14	+ ∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
15	Enable/disable -∆A tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
16	-∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
17	Enable/disable +ΔB tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
18	+ ΔB tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
19	Enable/disable -∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
20	-∆B tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
21	Enable/disable +ΔC tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
22	+ ΔC tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
23	Enable/disable -∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
24	-∆C tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
25	Enable/disable ΔE tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
26	ΔE tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
27	Enable/disable +∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
28	+ ΔIndex tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
29	Enable/disable -∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
30	-∆Index tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
31	Enable/disable +ΔA tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
32	+ ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
33	Enable/disable -∆A tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
34	-ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
35	Enable/disable +∆B tolerance value under	Integer; 1	0: Disable 1: Enable

	Illuminant 2		
36	+ ΔB tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
37	Enable/disable -∆B tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
38	-ΔB tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
39	Enable/disable +ΔC tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
40	+ ΔC tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
41	Enable/disable -∆C tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
42	-ΔC tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
43	Enable/disable ΔE tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
44	ΔE tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
45	Enable/disable +∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
46	+ \(\Delta \text{Index tolerance value} \) under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
47	Enable/disable -∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
48	-∆Index tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)

Explanation

Reads the tolerance parameters and values set for the specified default tolerance registration

[10] above (Color space) determines the meanings of A, B, and C in [13] through [24] and [31] through [42]: A is the first variable of the color space, B is the second, and C is the third. For example, if [10] is set to "1" (L*a*b*), then A=L*, B=a*, and C=b*. If [10] is set to "6" (Munsell), tolerances for A, B, and C are ignored.

[11] determines the meaning of E in [25], [26], [43] and [44]. [12] determines the meaning of Index in [27] to [30] and [45] to [48].

Error-ch	Error-check codes				
Code	Meaning				
OK00	Command was processed normally.				
OK03	Battery power of instrument is getting low.				
ER00	Invalid command string received.				
ER02	Battery power is too low for measurements.				
ER03	Input parameter error				
ER10	No data present.				

TOS	TOS (Default <u>To</u> lerance Values <u>S</u> et)				
	Function				
	ets the tolerance values of th strument.	e specified de	fault tolerance registration	n number stored in the	
Inpu	ıt/Output Format				
	"TOS,[1,2[1],[12 49,50" + Delimiter code				
			⟨□ Error-check code	ck code " + Delimiter	
Con	nmand Parameters				
	Meaning	Type; No. of characters	Details/range		
1	Default tolerance registration number	Integer; 2	01 to 08		
2	SCI/SCE mode	Integer; 1	1: SCI	2: SCE	
3	Tolerance type	Integer; 1	0 (Standard value)		
(Para	metric coefficients)				
4	(CMC) I	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
5	(CMC) c	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
6	(∆E*94) I	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
7	(ΔE*94) c	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
8	(ΔE*94) h	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
9	(ΔE2000) I	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
10	(ΔE2000) c	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
11	(ΔE2000) h	Integer; 3	001 to 999 (100× actual	I value: 0.01 to 9.99)	
(Tole	rance values)				
12	Color space	Integer; 2	01: L*a*b* 03: Hunter Lab 05: XYZ	02: L*C*h 04: Yxy 06: Munsell	
13	Color-difference equation	Integer; 2	01: ΔE* (1976) 03: ΔE* (1994)	02: CMC (I:c) 04: ΔE* (2000)	
14	Index	Integer; 2	00: None 01: WI (ASTM E313-73) 03: YI (ASTM E313-73) 05: ISO Brightness	02: WI (ASTM E313-96) 04: YI (ASTM D1925) 06: 8° gloss	
15	Enable/disable +ΔA tolerance value under Illuminant 1	Integer; 1	0: Disable	1: Enable	
16	+ ∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10× actual)	value: 0.1 to 20.0)	

KMSE A0E8-CS 0133E July 19, 2013 CM-700d/CM-600d Communication Specifications (Rev. 1.33)

17	Enable/disable -∆A tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
18	-∆A tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
19	Enable/disable +∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
20	+ ΔB tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
21	Enable/disable -∆B tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
22	-∆B tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
23	Enable/disable +∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
24	+ ΔC tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
25	Enable/disable -∆C tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
26	-∆C tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
27	Enable/disable ∆E tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
28	ΔE tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
29	Enable/disable +∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
30	+ ΔIndex tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
31	Enable/disable -∆Index tolerance value under Illuminant 1	Integer; 1	0: Disable 1: Enable
32	-∆Index tolerance value under Illuminant 1	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
33	Enable/disable +ΔA tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
34	+ ΔA tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
35	Enable/disable -∆A tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
36	-∆A tolerance value under Illuminant 2	Integer; 3	001 to 200 (10× actual value: 0.1 to 20.0)
37	Enable/disable +∆B tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
3 <i>8</i>	+ ΔB tolerance value	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)

	under Illuminant 2		
39	Enable/disable -∆B tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
40	- ΔB tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
41	Enable/disable +∆C tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
42	+ ΔC tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
43	Enable/disable -∆C tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
44	-∆C tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
45	Enable/disable ΔE tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
46	ΔE tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
47	Enable/disable +∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
48	+ \(\Delta \text{Index tolerance value} \) under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
49	Enable/disable -∆Index tolerance value under Illuminant 2	Integer; 1	0: Disable 1: Enable
50	-∆Index tolerance value under Illuminant 2	Integer; 3	001 to 200 (10x actual value: 0.1 to 20.0)
Res	ponse Parameters		
	Meaning	Type; No. of characters	Details/range

Explanation

Sets the tolerance parameters and values set for the specified default tolerance registration number. [12] (Color space) determines the meanings of A, B, and C in [15] through [26] and [33] through [44]: A is the first variable of the color space, B is the second, and C is the third. For example, if [12] is set to "1" (L*a*b*), then A=L*, B=a*, and C=b*. If [12] is set to "6" (Munsell), tolerances for A, B, and C should be disabled.

[13] determines the meaning of E in [27], [28], [45] and [46].

[14] determines the meaning of Index in [29] to [32] and [47] to [50].

Tolerance data can be set for any target number for which target data exists.

Settings for [12] Color Space, [13] Color difference equation, and [14] Index should be set to the same setting for SCI and SCE. If different settings are set, the SCE setting will take priority and be used for SCI also.

Error-ch	Error-check codes			
Code	Code Meaning			
OK00	Command was processed normally.			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too low for measurements.			

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

ER03	Input parameter error	
------	-----------------------	--

TOD (D	TOD (Default <u>To</u> lerance Values <u>D</u> elete)			
Function				
Delete	es the data for the specif	ied default tole	rance re	gistration number stored in the instrument.
Input/O	utput Format			
"TOD, 1"	+ Delimiter code		\Rightarrow	
			\(\rightarrow	" Error-check code " + Delimiter code
Comma	nd Parameters			
Me	aning	Type; No. of characters	Details	/range
1	Default tolerance registration number Integer; 2 01 to 08		8	
Respon	Response Parameters			
Me	Meaning Type; No. of characters		Details	/range
Explana	ation			
				istration number stored in the instrument. ce registration number, ER10 will be output.
Error-cl	heck codes			
Code	Meaning			
OK00	Command was processed normally.			
OK03	Battery power of instrument is getting low.			
ER00	Invalid command string received.			
ER02	Battery power is too lo	ow for measure	ements.	
ER03	Input parameter error			
ER10	No data present.			

TIR	TIR (Default <u>T</u> olerance <u>I</u> dentification <u>R</u> ead)				
Fun	Function				
R	Reads	the identification name	set for the spe	ecified default tolerance registration number.	
Inpu	ut/Ou	utput Format			
"TIF	٦, 1	+ Delimiter code	9	⇒	
				<pre> ' Error-check code , 1 " + Delimiter code </pre>	
Con	nma	nd Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1	Default tolerance registration number		Integer; 2	01 to 08	
Res	pon	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1	Ider	ntification name	Character; 11		
Exp	lana	tion			
R	Reads	the identification name	for the specifie	ed default tolerance registration number.	
Erro	or-ch	eck codes			
Со	Code Meaning				
OK00	Command was processed normally				
OK03	Battery power of instrument is getting low.			g low.	
ER00	ER00 Invalid command string received.				
ER02	ER02 Battery power is too low for measurements.			ements.	
ER03	ER03 Input parameter error.				

TIS (De	TIS (Default <u>T</u> olerance <u>I</u> dentification <u>S</u> et)				
Function	Function				
Sets	the identification name se	et for the speci	cified default tolerance registration number.		
Input/C	Output Format				
"TIS,1	,2" + Delimiter co	ode	⇒		
Comm	and Parameters				
Me	eaning	Type; No. of characters	Details/range		
1	efault tolerance egistration number	Integer; 2	01 to 08		
2 Ide	Identification name Character;		(See 4. Character codes.)		
Respo	nse Parameters				
Me	eaning	Type; No. of characters	Details/range		
Explan	nation				
Sets	the identification name fo	r the specified	d default tolerance registration number.		
Error-c	check codes				
Code Meaning					
OK00	Command was processed normally				
OK03	Battery power of instru	ument is gettin	ng low.		
ER00	Invalid command strin	g received.			
ER02	Battery power is too lo	ow for measure	rements.		
ER03	Input parameter error.				

2.2.8 Settings; Other items

APR	APR (<u>A</u> uto <u>P</u> rint Status <u>R</u> ead)				
Fun	Function				
R	eads	current automatic print	status of instru	rument.	
Inpu	ıt/Oı	utput Format			
"APR	." +	Delimiter code		\Rightarrow	
⟨□ Error-check code , 1 " + Delimiter code					
Con	nmai	nd Parameters			
	Mea	aning	Type; No. of characters	Details/range	
Res	pons	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1	Auto	print status	Integer; 1	0: Disabled 1: Enabled	
Ехр	lana	tion			
R	eads	current automatic print	status of instru	rument.	
Erro	r-ch	eck codes			
Cod	Code Meaning				
ОК00		Command was proces	ssed normally	,	
OK03	DK03 Battery power of instrument is getting low.			ng low.	
ER00		Invalid command strin	g received.		
ER02		Battery power is too lo	ow for measure	rements.	

APS	APS (<u>A</u> uto <u>P</u> rint Status <u>S</u> et)				
Func	Function				
Se	ets automatic print status of	instrument.			
Inpu	t/Output Format				
"APS	,1" + Delimiter cod	е	↔		
	⇔ <u>Error-check code</u> " + <u>Delimiter</u>				
Com	mand Parameters		,		
	Meaning	Type; No. of characters	Details/range		
1	Auto print status	Integer; 1	0: Disabled 1: Enabled		
Resp	oonse Parameters				
	Meaning	Type; No. of characters	Details/range		
Expl	anation				
Sets automatic print status of instrument. When [1] is set to "1" (enabled) with the instrument in standalone mode and connected to a printer, measurement results will be automatically sent to the printer after each measurement. Printed results will vary according to the instrument's screen display setting.					
Erro	r-check codes				
Cod	Code Meaning				
OK00	Command was processed normally		>		
OK03	Battery power of inst	rument is gettin	ng low.		
ER00	Invalid command stri	ng received.			
ER02	Battery power is too	low for measure	ements.		
ER03	Input parameter erro	Input parameter error.			

DFR	DFR (<u>D</u> ate <u>F</u> ormat <u>R</u> ead)				
Fun	Function				
R	eads	date format of instrume	ent.		
Inpu	ıt/Oı	utput Format			
"DFR	?" +	Delimiter code		\Rightarrow	
				<pre></pre>	
Con	nmaı	nd Parameters			
	Mea	aning	Type; No. of characters	Details/range	
Res	pon	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1	Date	e format	Integer; 1	0: YYYY/MM/DD 1: MM/DD/YYYY	
Ехр	lana	tion			
R	eads	date format of instrume	ent.		
Erro	or-ch	eck codes			
Code Meaning					
OK00)	Command was proce	ssed normally		
OK 0 3	3	Battery power of instrument is getting low.			
ER00)	Invalid command strir	ng received.		
ER02	2	Battery power is too lo	ow for measure	ements.	

DFS (D	DFS (<u>D</u> ate <u>F</u> ormat <u>S</u> et)				
	Function				
Sets	date format of instrument				
Input/C	Output Format				
"DFS,1	" + Delimiter code		⇒		
	⟨□ Error-check code " + Delimiter code				
Comma	and Parameters				
Me	eaning	Type; No. of characters	Details/range		
1 Da	ate format	Integer; 1	0: YYYY/MM/DD 1: MM/DD/YYYY		
Respoi	nse Parameters				
Me	eaning	Type; No. of characters	Details/range		
Explan	ation				
The c	Sets date format of instrument. The date format affects only how dates are shown in the instrument's screen display. The date format used for setting/reading data for communication commands is fixed and is not affected by this setting.				
Error-c	heck codes				
Code	e Meaning				
OK00	Command was proces	Command was processed normally			
OK 0 3	Battery power of instr	Battery power of instrument is getting low.			
ER00	Invalid command strin	g received.			
ER02	Battery power is too lo	ow for measure	ements.		
ER03	Input parameter error.				

DPF	DPR (<u>D</u> ata <u>P</u> roperty <u>R</u> ead)				
Fun	Function				
R	eads	data properties of inst	rument.		
Inpu	ut/Ou	ıtput Format			
"DPR	₹ " +	Delimiter code		⇒	
				<pre></pre>	
Con	nmaı	nd Parameters			
	Mea	aning	Type; No. of characters	Details/range	
Res	pons	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1	Targ stat	get data protection us	Integer; 1	0: Disabled 1: Enabled	
2	Data	a list display format	Integer; 1	1: Name 2: Date/time 3: Pseudocolor patch	
3		surement screen lay setting	Integer; 1	0: List display 1: Detail display	
4	Targ sett	get screen display ing	Integer; 1	0: List display 1: Detail display	
Ехр	lana	tion			
				data protection status, data list display format, screen display setting.	
Erro	rror-check codes				
Co	de	Meaning			
OK00)	Command was processed normally			
ОК03	3	Battery power of inst	rument is gettir	ng low.	
ER00)	Invalid command stri	ng received.		
ER02	2	Battery power is too	low for measur	ements.	

DP	DPS (<u>D</u> ata <u>P</u> roperty <u>S</u> et)					
	Function					
	Sets data properties of instrument.					
Inp	ut/Oı	utput Format				
"DP	s,[1],[2,3,4" + Delimit	er code	⇔		
	I I-					
				" Error-check code" + Delimiter		
				<u>code</u>		
Coı	mma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Tar stat	get data protection us	Integer; 1	0: Disabled 1: Enabled		
2	Dat	a list display format	Integer; 1	1: Name 2: Date/time 3: Pseudocolor patch		
3		asurement screen play setting	Integer; 1	0: List display 1: Detail display		
4	Tar sett	get screen display ing	Integer; 1	0: List display 1: Detail display		
Res	spon	se Parameters	'			
	Mea	aning	Type; No. of characters	Details/range		
Exp	olana	ition				
	Sets data properties of instrument: Data protection status, data list display format, measurement screen display setting, target screen display setting. [1] (Target data protection status) applies to all target data. When [1] is set to "1" (enabled), creation of new targets is possible but overwriting existing target data cannot be performed.					
Err	Error-check codes					
Co	Code Meaning					
OK00 Command was processed norm		ssed normally				
	OK03 Battery power of instrument is getting low.		g low.			
ER0	\rightarrow	Invalid command strir				
ER0		Battery power is too le		ements.		
ER0	3	Input parameter error.				

DTR	DTR (<u>D</u> ate and <u>T</u> ime <u>R</u> ead)					
Fun	Function					
R	Reads the current date and time set on the instrument.					
Inpu	ıt/Oı	utput Format				
"DTR	- +	Delimiter code		\Rightarrow		
				\(\tau\) \(\text{Error-check code}\) \(\text{1}, \begin{align*} 2, \begin{align*} 3, \begin{align*} 4, \begin{align*} 5, \begin{align*} 6 \\ \text{Delimiter code} \end{align*}		
Com	nma	nd Parameters				
	Mea	aning	Type; No. of characters	Details/range		
Res	pon	se Parameters				
	Mea	aning	Type; No. of characters	Details/range		
1	Yea	ır	Integer; 4	2000 to 2050		
2	Mor	nth	Integer; 2	01 to 12		
[3]	Day	,	Integer; 2	01 to 31 (Depending on month)		
4	Hou	ır	Integer; 2	00 to 23 (24-hour clock)		
5	Min	ute	Integer; 2	00 to 59		
6	Sec	cond	Integer; 2	00 to 59		
Ехр	lana	ition				
	Reads the current date and time set on the instrument. Output format is fixed and does not depend on the date/time format set using DFS.					
Erro	Error-check codes					
Cod	de	Meaning				
OK00		Command was processed normally				
OK03		Battery power of instru	ument is gettin	g low.		
ER00		Invalid command strin	g received.			
ER02		Battery power is too low for measurements.				

DTS	DTS (<u>D</u> ate and <u>Time Set</u>)				
	Function				
Se	ets th	e date and time on the	instrument.		
Inpu	t/Oı	itput Format			
		,,3,4,5,6" + Del	imiter		
code]			⇒	
				<pre></pre>	
Com	ımaı	nd Parameters			
	Mea	ning	Type; No. of characters	Details/range	
1	Yea	r	Integer; 4	2000 to 2050	
2	Mon	th	Integer; 2	01 to 12	
3	Day		Integer; 2	01 to 31 (Depending on month)	
4	Hou	r	Integer; 2	00 to 23 (24-hour clock)	
5	Minu	ute	Integer; 2	00 to 59	
6	Sec	ond	Integer; 2	00 to 59	
Resp	oons	se Parameters			
	Mea	ning	Type; No. of characters	Details/range	
				*	
Expl	ana	tion			
Se	ets th	e current date and time		trument. date/time format set using DFS.	
Erro	Error-check codes				
	Code Meaning				
OK00					
OK03	Battery power of instrument is getting low.				
ER00		Invalid command strin	g received.		
ER02		Battery power is too lo	w for measure	ements.	
ER03		Input parameter error.			

LAR (LAR (<u>La</u> nguage <u>R</u> ead)				
Func	Function				
Rea	ads the display language of	the instrumen	ıt.		
Input	/Output Format				
"LAR"	+ Delimiter code		⇔		
	$\Leftrightarrow \frac{\text{``Error-check code'}}{\text{+Delimiter code'}}, 1''$				
Comr	mand Parameters				
	Meaning	Type; No. of characters	Details/range		
Resp	onse Parameters				
	Meaning	Type; No. of characters	Details/range		
1	Language	Integer; 1	1: English 2: Japanese 3: German 4: French 5: Spanish 6: Italian 7: Chinese		
Expla	nation				
Rea	ads the display language of	the instrumen	it.		
Error	-check codes				
Code	e Meaning				
OK00	Command was proces	ssed normally			
OK03	Battery power of instru	ument is gettin	g low.		
ER00	Invalid command strin	g received.			
ER02	Battery power is too lo	ow for measure	ements.		

LAS	LAS (<u>La</u> nguage <u>S</u> et)				
Fun	Function				
S	ets th	e display language of th	ne instrument.	i.	
Inpu	ıt/Oı	utput Format			
"LAS	3,1"	+ Delimiter code	•	⇒	
				⇔ "Error-check code" + Delimiter code	
Con	nmai	nd Parameters			
			Type; No. of characters	Details/range	
1	Language		Integer; 1	1: English 2: Japanese 3: German 4: French 5: Spanish 6: Italian 7: Chinese	
Res	pons	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
Ехр	lana	tion			
S	ets th	e display language of th	ne instrument.		
Erro	Error-check codes				
Co	Code Meaning				
OK00	Command was processed normally				
OK03	3	Battery power of instrument is getting low.			
ER00)	Invalid command string received.			
ER02	2	Battery power is too lo	ow for measure	rements.	
ER03	3	Input parameter error.			

LPR	LPR (<u>L</u> ow Power Attribute <u>R</u> ead)				
Fun	Function				
R	leads	the low power attribute	(time before a	activation of power save function) of the instrument.	
Inpu	ut/Ou	ıtput Format			
"LPR	۲" +	Delimiter code		⇒	
	⇔ "Error-check code , I" + Delimiter code				
Con	nmaı	nd Parameters			
	Mea	aning	Type; No. of characters	Details/range	
Res	pons	se Parameters			
	Mea	aning	Type; No. of characters	Details/range	
1		e before activation of er save function	Integer; 2	00 to 60 (seconds)	
Ехр	lana	tion			
				activation of power save function) of the instrument. disabled and the instrument never enters standby.	
Erro	Error-check codes				
Co	de	Meaning			
OK00)	Command was processed normally			
OK 0 3	3	Battery power of instrument is getting low.			
ER00)	Invalid command strin	ng received.	>	
ER02	2	Battery power is too lo	ow for measure	ements.	

LPS	LPS (<u>L</u> ow Power Attribute <u>S</u> et)				
Fun	Function				
S	Sets th	e low power attribute (t	ime before act	ivation of power save function) of the instrument.	
Inp	ut/Oı	tput Format			
"LPS	S , 1 "	+ Delimiter code	9	⇒	
				□ Error-check code	
Cor	nmaı	nd Parameters			
	Mea	ining	Type; No. of characters	Details/range	
1		e before activation of er save function	Integer; 2	00 to 60 (seconds)	
Res	pons	se Parameters			
	Mea	ning	Type; No. of characters	Details/range	
Exp	lana	tion			
				ivation of power save function) of the instrument. disabled and the instrument never enters standby.	
Erro	or-ch	eck codes			
Со	Code Meaning				
OK00)	Command was processed normally			
OK03	3	Battery power of instrument is getting low.			
ER00)	Invalid command strir	ng received.		
ER02	2	Battery power is too lo	ow for measure	ements.	
ER03	3	Input parameter error			

OVE	OVR (<u>Ov</u> erwrite Message Status <u>R</u> ead)					
Fun	Function					
R	leads	current overwrite mess	age display er	nabled/disabled status of instrument.		
Inpu	ut/Ou	utput Format				
"OVF	۲" +	Delimiter code		\Rightarrow		
				<pre></pre>		
Con	nma	nd Parameters				
	Mea	eaning Type; No. of characters Details/rang		Details/range		
Res	Response Parameters					
	Mea	aning	Type; No. of characters	Details/range		
1	Ove	erwrite message us	Integer; 1	Disabled (Overwrite warning not shown.) Enabled (Overwrite warning shown when applicable)		
Ехр	lana	tion				
R	Reads current overwrite message display enabled/disabled status of instrument.					
Erro	Error-check codes					
Co	de	Meaning				
OK00)	Command was processed normally				
OK03	3	Battery power of instr	ument is gettin	ng low.		
EROC)	Invalid command strir	g received.			
ER02	2	Battery power is too low for measurements.				

ovs	OVS (<u>Ov</u> erwrite Message Status <u>S</u> et)						
Fun	Function						
S	ets ov	verwrite message displa	y enabled/disa	abled status of instrument.			
Inpu	ıt/Oı	utput Format					
"OVS	3,1"	+ Delimiter code	9	\updownarrow			
	⇔ <u>"Error-check code</u> " + <u>Delimiter</u> code						
Con	nma	nd Parameters					
	Mea	aning	Type; No. of characters	Details/range			
1		Overwrite message Integer; 1 0: Disabled (Overwrite warning not shown.) 1: Enabled (Overwrite warning shown when applicable)					
Res	pon	se Parameters					
	Mea	aning	Type; No. of characters	Details/range			
Ехр	lana	tion					
V	Sets overwrite message display enabled/disabled status of instrument. When [1] is set to "0" (disabled), no warning message is displayed before overwriting an existing target.						
Erro	Error-check codes						
Co	de	Meaning					
OK00)	Command was processed normally					
OK 0 3	}	Battery power of instrument is getting low.					
ER00)	Invalid command string received.					
ER02	}	Battery power is too lo	ow for measure	ements.			
ER03	1	Input parameter error.					

DSF	DSP (<u>Disp</u> lay String Register)						
Fun	Function						
R	Registers character string for later display on instrument LCD.						
Inpu	ut/Oı	utput Format					
"DSI	₽,1,	2,3,4" + Delimi	ter code	⇒			
	⟨⇒ "Error-check code" + Delimiter code						
Con	nma	nd Parameters					
	Mea	aning	Type; No. of characters	Details/range			
1	Scr	een line number	Integer; 1	1 to 9			
2	Cha	aracter color	Character; 6	Hexadecimal values 2 characters (8 bit) each for R, G, and B			
3	Bac	kground color	Character; 6	Hexadecimal values 2 characters (8 bit) each for R, G, and B			
4		aracter string to be played	Character; 20	ASCII characters. (See Table 4.)			
Res	pon	se Parameters					
	Mea	aning	Type; No. of characters	Details/range			
Exp	lana	tion					
C T	Stores character strings for display in the instrument's LCD. To actually update the LCD with the character string, use the command DSF. The character color and background color can be set individually for each string, as well as the character string to be displayed. Only ASCII characters shown in Table 4 should be used.						
Erro	Error-check codes						
Co	de	Meaning					
OK00	0	Command was processed normally					
OK03	3	Battery power of instrument is getting low.					
ER00	0	Invalid command string received.					
ER02	Battery power is too low for measurements.						

DSC (Di	DSC (<u>Dis</u> play String <u>C</u> lear)						
Function	Function						
Deletes	s all character strings fo	r display store	d in the instrument.				
Input/Ou	utput Format						
"DSC" +	Delimiter code		\Diamond				
	⇔ <u>Error-check code</u> " + <u>Delimiter</u> code						
Comma	nd Parameters						
Mea	aning	Type; No. of characters	Details/range				
Respons	se Parameters						
Mea	aning	Type; No. of characters	Details/range				
Explana	tion						
	Deletes all character strings for display stored in the instrument. To actually update the LCD, use the command DSF.						
Error-ch	Error-check codes						
Code	Meaning						
OK00	Command was processed normally						
OK03	Battery power of instrument is getting low.						
ER00	Invalid command strin	g received.	·				
ER02	Battery power is too lo	ow for measure	ements.				

DSF (D	DSF (<u>D</u> isplay Refresh)					
Function	Function					
Refre	shes the instrument LCD	to show the c	haracter strings for display stored in the instrument.			
Input/C	Output Format					
"DSF"	Delimiter code		₽			
			⇔ "Error-check code" + Delimiter code			
Comm	and Parameters					
Me	eaning	Type; No. of characters	Details/range			
Respo	nse Parameters					
Me	eaning	Type; No. of characters	Details/range			
Explan	ation					
Refre	shes the instrument LCD	to show the c	haracter strings for display stored in the instrument.			
Error-c	or-check codes					
Code	Meaning					
OK00	Command was proces	Command was processed normally				
OK03	Battery power of instru	ument is gettin	g low.			
ER00	Invalid command strin	ng received.				
ER02	Battery power is too lo	ow for measure	ements.			

ATR	ATR (<u>A</u> uto <u>T</u> arget Status <u>R</u> ead)						
Fun	Function						
R	eads	current automatic targe	t status of inst	rument.			
Inpu	ut/Ou	ıtput Format					
"ATF	?" +	Delimiter code		\Rightarrow			
	⇔ <u>Error-check code</u> , i" + Delimiter code						
Con	nmaı	nd Parameters					
	Mea	eaning Type; No. of characters Details/range		Details/range			
Res	Response Parameters						
	Mea	aning	Type; No. of characters	Details/range			
1	Auto	target status	Integer; 1	0: Disabled 1: Enabled			
Exp	lana	tion					
R	eads	current automatic targe	t status of inst	rument.			
Erro	or-ch	eck codes					
Co	de	Meaning					
ОК00)	Command was processed normally					
ОК03	3	Battery power of instrument is getting low.					
ER00)	Invalid command string received.					
ER02	2	Battery power is too lo	w for measure	ements.			
ER03	3	Input parameter error.					

ATS (A	ATS (<u>A</u> uto <u>T</u> arget Status <u>S</u> et)					
Functio	Function					
Sets a	utomatic target status o	f instrument.				
Input/O	utput Format					
"ATS,1"	+ Delimiter code	9	⇔			
	⟨□ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					
Comma	nd Parameters					
Mea	aning	Type; No. of characters	Details/range			
[<u>]</u> Aut	Auto target status Integer; 1 0: Disabled 1: Enabled		0.000000			
Respon	Response Parameters					
Mea	aning	aning Type; No. of characters Details/range				
Explana	ntion					
When	Sets automatic target status of instrument. When [1] is set to "1" (enabled), the time required to create the list for automatic target selection depends on the number of data stored. Timeout time should be set to at least 10 seconds.					
Error-ch	Error-check codes					
Code	Meaning					
OK00	Command was processed normally					
OK03	Battery power of instrument is getting low.					
ER00	Invalid command string received.					
ER02	Battery power is too low for measurements.					
ER03	Input parameter error					

3 Error-check codes

Code	Meaning	Details
OK00	Command was processed normally	
OK02	Low xenon lamp illumination	The brightness of the light source has decreased due to lamp aging, staining of the integrating sphere surface, etc.
OK03	Battery power of instrument is getting low.	
OK 0 4	Low xenon lamp illumination/low battery power	
OK09	Spectral reflectance exceeds the measurement range.	Spectral reflectance is higher than 175%, the upper limit of the specified measurement range.
ER00	Invalid command string received.	The input command or parameter is invalid.
ER02	Battery power is too low for measurements.	Battery power is low and the flash charging circuit cannot function. Further measurements cannot be performed.
ER03	Input parameter error.	The input parameter is outside the specified range.
ER05	Xenon lamp flash error	Xenon lamp did not flash during calibration or measurement.
ER07	Zero calibration and white calibration have not been performed.	Zero calibration was not performed at the current instrument settings (SCI/SCE and measurement area).
ER08	Communication error	During receipt of a command by the instrument, a communication error such as an overrun occurred.
ER10	No data present.	No data are available for the requested item (measurement, target, or calibration data) at the specified settings (measurement area, SCI/SCE).
ER11	Calibration not performed correctly.	The count values obtained during zero calibration or white calibration are not within the normal range.
ER13	A/D conversion error	A/D conversion could not be performed properly during measurement.
ER17	Clock error	Clock IC is not operating properly.
ER20	Data write error	When setting values, etc., an error occurred while writing to the instrument.
ER22	No user calibration data	No user calibration data stored in instrument.
ER24	White calibration not performed.	White calibration has not been performed at the current instrument settings (SCI/SCE, measurement area)
ER25	Input measurement area and instrument measuring area setting do not match.	The current measurement area (lens position) on the instrument is different than the input measurement area (lens position).
ER27	Charge circuit error	Charging of the capacitor for the xenon lamp flash was not completed correctly.
ER28	Preparations for next measurement have not been completed.	The capacitor for the xenon lamp flash is currently being charged and preparations for the next measurement have not been completed.
ER35	Measurement in process	Instrument is currently in the process of taking a measurement.
ER36	User calibration not completed.	User calibration is enabled but user calibration under the current instrument settings (SCI/SCE,

KMSE A0E8-CS 0133E

July 19, 2013

CM-700d/CM-600d Communication Specifications (Rev. 1.33)

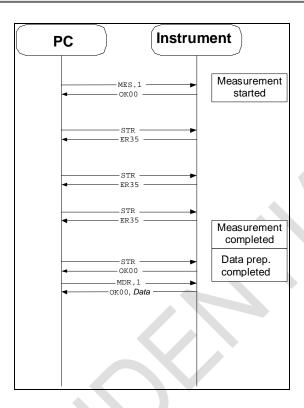
		measurement area) has not been completed.
ER69	Target data protection status is on.	Color difference target data are protected and cannot be modified or deleted. To set target data protection status to off, use the DPS command.

4 Character table

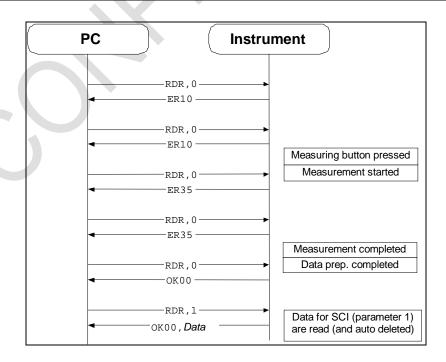
	20	30	40	50	60	70
0	sp	0	@	Р	`	р
1		1	Α	Q	а	q
2	-	2	В	R	b	r
3	#	3	С	S	С	S
4	\$	4	D	Т	d	t
5	%	5	Е	J	е	u
6	&	6	F	>	f	V
7	'	7	G	W	g	W
8	(8	Н	Χ	h	Х
9)	9	ı	X Y	i	у
Α	*	• •	っ	Z	j	Z
В	+	•	K		k	~
С	,	٧	┙	¥	-	
D	-	=	М]	m	}
Е		^	Ν	<	n	
F	/	?	0		0	

Appendix A: Measurement flow

Measurement controlled by PC



Measurement controlled by instrument measuring button



Appendix B: Communication command flow

The following command flows are for reference and show the general flow of how to use multiple commands to perform various functions.

B.1 From startup to measurement ((Results read as spectral
data)	

Step	Process	Command
1	Set measurement parameters.	<u>CPS</u> ,
2	Read instrument status information.	STR
3	Perform zero calibration.	ZRC
4	Read white calibration data.	<u>CDR</u> ,
5	Perform white calibration	CAL
6	Perform measurement	MES, 1
7	Read status information	STR (Repeat until response is "OK00")
8	Read measurement data	<u>MDR</u> ,

- Before performing step 1, the current instrument measurement parameters can be checked using CPR, and if the parameters are the desired parameters, it is not necessary to set parameters as in step 1.
- In step 2, STR is used to check whether zero calibration at the current measurement parameters has been performed. If zero calibration at the measurement parameters has already been performed and the results are still present in the instrument, zero calibration in step 3 is not necessary.
- In step 4, the white calibration data are read to verify that white calibration data are present in the instrument.
- In step 7, whether or not measurement and data preparations have been completed is checked using STR repeatedly. When the response is OK00, measurement and data preparations have been completed and step 8 can be performed.

B.2 From startup to measurement (Results read as colorimetric data)

Step	Process	Command
1	Set measurement parameters.	<u>CPS</u> ,
2	Read instrument status information.	STR
3	Perform zero calibration.	ZRC
4	Read white calibration data.	<u>CDR</u> ,
5	Perform white calibration	CAL
6	Perform measurement	MES,1
7	Read status information	STR (Repeat until response is "OK00")
8	Read measurement data	<u>COR</u> ,

- Before performing step 1, the current instrument measurement parameters can be checked using CPR, and if the parameters are the desired parameters, it is not necessary to set parameters as in step 1.
- In step 2, STR is used to check whether zero calibration at the current measurement parameters has been performed. If zero calibration at the measurement parameters has already been performed and the results are still present in the instrument, zero calibration in step 3 is not necessary.
- In step 4, the white calibration data are read to verify that white calibration data are present in the instrument.
- In step 7, whether or not measurement and data preparations have been completed is checked using STR repeatedly. When the response is OK00, measurement and data preparations have been completed and step 8 can be performed.

B.3 Setting white calibration data				
Step	Process	Command		
1	Set white calibration data.	<u>CDS</u> ,		

 When this command is performed, white calibration data are written to non-volatile memory in the instrument.

B.4 Taking measurements using measuring button in communication mode (Results read as spectral data)

Step	Process	Command	
1	Set measurement parameters.	<u>CPS</u> ,	
2	Read instrument status information.	STR	
3	Perform zero calibration.	ZRC	
4	Read white calibration data.	CDR,	
5	Perform white calibration	CAL	
6	Enable measuring button.	<u>SWS</u> ,1	
7	Perform measurement.	(Press measuring button.)	
8	Check whether data is available.	RDR, 0 (Repeat until response is "OK00")	
9	Read measurement data.	RDR,	
(To co	(To continue with further measurements, repeat steps 6 through 9.)		

- In step 7, measurement is taken by pressing the instrument's measuring button.
- In step 8, whether or not measurement and data preparations have been completed is checked using RDR,0 repeatedly. When the response is OK00, measurement and data preparations have been completed and step 9 can be performed.
- In step 9, the measured data are read. When data are read at the SCI/SCE setting specified by the parameter input with RDR, the data for that setting are automatically deleted from the instrument's buffer. Attempting to read that data a second time will result in an error being returned.
- After the measuring button is pressed to take a measurement in step 7, the
 measuring button is automatically disabled. To continue taking measurements
 using the measuring button, it is necessary to re-enable the measuring button as
 in step 6 and repeat the remaining steps.

B.5 Taking measurements using measuring button in communication mode (Results read as colorimetric data)

Step	Process	Command	
1	Set measurement parameters.	<u>CPS</u> ,	
2	Read instrument status information.	STR	
3	Perform zero calibration.	ZRC	
4	Read white calibration data.	CDR,	
5	Perform white calibration	CAL	
6	Enable measuring button.	SWS,1	
7	Perform measurement.	(Press measuring button.)	
8	Check whether data is available.	RDR, 0 (Repeat until response is "OK00")	
9	Read measurement data.	<u>RCR</u> ,	
(To continue with further measurements, repeat steps 6 through 9.)			

- In step 7, measurement is taken by pressing the instrument's measuring button.
- In step 8, whether or not measurement and data preparations have been completed is checked using RDR,0 repeatedly. When the response is OK00, measurement and data preparations have been completed and step 9 can be performed.
- In step 9, the colorimetric data calculated from the measured data are read.
- After the measuring button is pressed to take a measurement in step 7, the
 measuring button is automatically disabled. To continue taking measurements
 using the measuring button, it is necessary to re-enable the measuring button as
 in step 6 and repeat the remaining steps.

B.6 Performing user calibration and taking measurement Step Process Command <u>UCS</u>, ... Set user calibration data. Enable user calibration. Set measurement parameters. Read instrument status information. ZRC Perform zero calibration. USC Perform user calibration MES,1 Perform measurement 8 STR (Repeat until response is "OK00") Read status information MDR,... Read measurement data