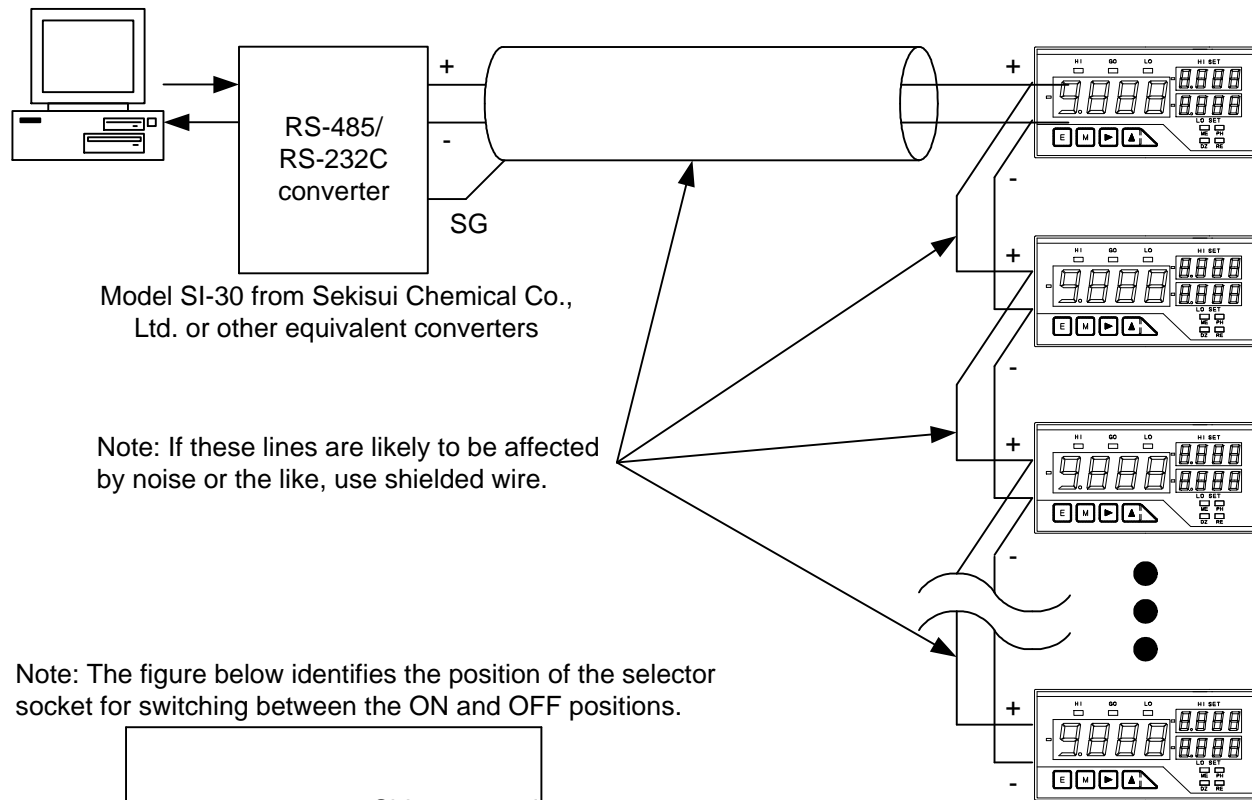




3.3. Example of RS-485 Connection

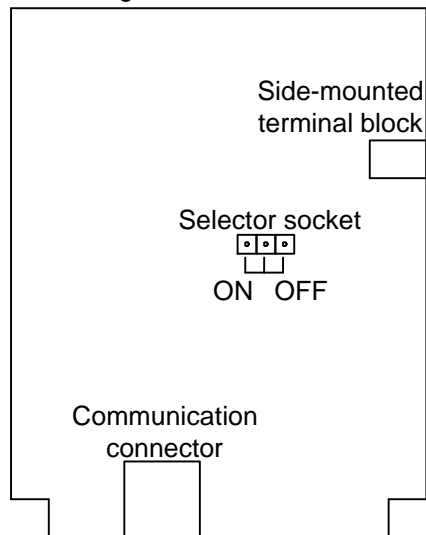
If the panelmeter is positioned to be an end station as the result of an RS-485 connection, set the terminator to ON by using the selector socket in the FD5000 output unit.



Model SI-30 from Sekisui Chemical Co., Ltd. or other equivalent converters

Note: If these lines are likely to be affected by noise or the like, use shielded wire.

Note: The figure below identifies the position of the selector socket for switching between the ON and OFF positions.



Parts-mounted side of FD5000 output unit

Note: If the panelmeter is an end station, set the terminator to ON.

4. Communication Function Parameters

The baud rate, data length, parity bit, stop bit, delimiter, and device ID (RS-485 only) are the user-selectable parameters of the communication functions provided by the FD5000 panelmeter. For details on how to set the parameters, see the user's manual of the FD5000 main unit.

5. RS-485 Transmission/Reception Formats

5.1. Establishing and Releasing the Communication Link

Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Char. Length	
Establishment of communication link	ENQ	0	1	CR	LF																				3
	Note: Set a two-digit number as the device ID (00 is void).																								
Release of communication link	EOT	CR	LF																						1
	Note: Communication is still possible when another device ID is specified without releasing the communication link.																								

5.2. Available Control Codes

Control Code	Hexadecimal	Name	Description
STX	02H	Start of Text	Marks the starting point of text.
ETX	03H	End of Text	Marks the ending point of text.
EOT	04H	End of Transmission	Marks the end of transmission.
ENQ	05H	Enquiry	Denotes an enquiry.
ACK	06H	Acknowledge	Denotes an affirmative reply.

Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Char. Length	
Scaling data response	M	E	T	CR	LF																				3
	Note: The reading of the main unit changes to MET the moment it receives a MET command.																								
	N	CR	LF																						1
	(Response with a full-scale reading.)																								
	N	CR	LF																						1
	(Response with a full-scale input value.)																								
	N	CR	LF																						1
	(Response with an offset reading.)																								
	N	CR	LF																						1
	(Response with an offset input value.)																								
	N	CR	LF																						1
	(Response with the HI value of the digital limiter.)																								
	N	CR	LF																						1
	(Response with the LO value of the digital limiter.)																								
	N	CR	LF																						1
	(Response with the HI reading of the analog output.)																								
	N	CR	LF																						1
	(Response with the LO reading of the analog output.)																								
	N	CR	LF																						1
	(Response with the position of the decimal point.)																								
	R	CR	LF																						1
	Note: The main unit returns to measurement operation upon an R command (or returns to the response with the full-scale reading if an N command is sent.)																								
Scaling data setting	M	E	T	CR	LF																				3
	Note: This example shows a case where FSC is set to 8000 and OFS to 20.																								
	8	0	0	0	CR	LF																			4
	(Sets the full-scale reading to 8000.)																								
	N	CR	LF																						1
	(Response with the full-scale reading to 8000.)																								
	N	CR	LF																						1
	(Sets the offset reading to 20.)																								
	2	0	CR	LF																					2
	(Sets the offset reading to 20.)																								
	R	CR	LF																						1
	Note: If an R command is sent after setting required data, the main unit saves data provided up to that moment and then returns to measurement operation.																								
	E	r	r	o	r	CR	LF																		6
	(Response when a value outside the setpoint range is input.)																								
Linearization function status response	L	I	N	CR	LF																				3
	(Response with the status of the linearization function being set to OFF.)																								
	L	I	N	CR	LF																				6
	(Response with the status of the linearization function being set to ON.)																								
	L	I	N	CR	LF																				7
	(Response with the status of the linearization function being cleared.)																								
Linearization function status setting	L	I	N	O	F	F	CR	LF																	7
	(Sets the linearization function to an OFF status.)																								
	L	I	N	O	N	CR	LF																		6
	(Sets the linearization function to an ON status.)																								
	L	I	N	C	L	R	CR	LF																	7
	(Sets the linearization function to a cleared status.)																								
	N	O	?	CR	LF																				5
	(Response with the status of the linearization function being cleared.)																								
	Note: Since the linearization data are all cleared when the linearization function is cleared, the main unit does not accept either a LIN ON or LIN OFF command. (Set the linearization function status after setting the linearization data again.)																								
Response for number of linearization correction data items	L	N	O	CR	LF																				3
	(Response with the status of the linearization function being cleared.)																								
	L	N	O	0	0	CR	LF																		6
	(Response with the status of the number of linearization correction data items being 02.)																								
	L	N	O	1	6	CR	LF																		6
	(Response with the status of the number of linearization correction data items being 16.)																								
Setting for number of linearization correction data items	L	N	O	0	2	CR	LF																		6
	(Sets the number of linearization correction data items to 02.)																								
	L	N	O	1	6	CR	LF																		6
	(Sets the number of linearization correction data items to 16.)																								
	E	r	r	o	r	CR	LF																		6
	(Response when linearization data is not correctly set.)																								
	Note: Set the number of linearization correction data items after setting linearization data.)																								
Linearization data response	L	N	D	0	1	CR	LF																		6
	Note: A reading can be made from any of the data items 01 to 16.																								
	Note: The reading of the main unit changes to LINE the moment it receives an LND XX command.																								
	N	CR	LF																						1
	(Response with the output value of linearization data N-01.)																								
	L	N	D	0	1	O	=																		14
	(Response with the input value of linearization data N-01.)																								
	L	N	D	0	2	I	=																		14
	(Response with the input value of linearization data N-02.)																								
	L	N	D	0	2	O	=																		14
	(Response with the output value of linearization data N-02.)																								
	L	N	D	0	3	I	=																		14
	(Response with the input value of linearization data N-03.)																								
	L	N	D	1	6	I	=																		14
	(Response with the input value of linearization data N-16.)																								
	L	N	D	1	6	O	=																		14
	(Response with the output value of linearization data N-16.)																								
	R	CR	LF																						1
	Note: The main unit returns to measurement operation upon an R command (or returns to the response with the input value of linearization data N-01 if an N command is sent.)																								
Linearization data setting	L	N	D	0	1	CR	LF																		6
	Note: Setting can be made from any of the data items 01 to 16.																								
	Note: The reading of the main unit changes to LINE the moment it receives an LND XX command.																								
	-	1	0	0	0	CR	LF																		4
	(Sets the input value of linearization data N-01 to -1000.)																								
	N	CR	LF																						1
	(Response with the input value of linearization data N-01 to -1000.)																								
	-	9	0	0	CR	LF																			1
	(Sets the output value of linearization data N-01 to -900.)																								
	N	CR	LF																						1
	(Response with the output value of linearization data N-01 to -900.)																								
	-	5	0	0	CR	LF																			1
	(Sets the input value of linearization data N-02 to -500.)																								
	N	CR	LF																						1
	(Response with the input value of linearization data N-02 to -500.)																								
	-	6	0	0	CR	LF																			1
	(Sets the output value of linearization data N-01 to -600.)																								
	R	CR	LF																						1
	Note: If an R command is sent after setting required data, the main unit saves data provided up to that point and then returns to measurement operation.																								
	E	r	r	o	r	CR	LF																		6
	(Response when a value outside the setpoint range is input.)																								



Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Char. Length		
Digital zero remote control response	D	Z	R	CR	LF																				3	
	(Response with the status of the digital zero function being set to OFF by remote control) D   Z   R   0   0   0   0   CR   LF (Response with the status of the digital zero function being set to ON by remote control) D   Z   R   1   0   0   0   CR   LF Note: The main unit responds with the reading when the digital zero function is set to ON.																							7		
Digital zero terminal response	E	Z	A	CR	LF																					3
	D   Z   R   O   F   F   CR   LF (Response with the OFF status of the digital zero function) D   Z   R   O   N   CR   LF (Response with the ON status of the digital zero function)																							7		
Digital zero remote control	D	Z	R	O	N	CR	LF																			6
	(Sets the digital zero function to ON.) D   Z   R   0   0   0   0   CR   LF (Sets the digital zero function to OFF.) D   Z   R   1   0   0   0   CR   LF (Sets the digital zero function to ON at 1000.)																							5		
Digital zero remote control cancellation	E	Z	M	CR	LF																					3
	Y   E   S   CR   LF (Response with the status of the comparison output being set to OFF by remote control) R   L   Y   H   I   CR   LF (Response with the status of the comparison output being set to ON for HI by remote control) R   L   Y   G   O   CR   LF (Response with the status of the comparison output being set to ON for GO by remote control) R   L   Y   L   O   CR   LF (Response with the status of the comparison output being set to ON for LO by remote control)																							7		
Comparison output remote control response	R	L	Y	CR	LF																					3
	(Response with the status of the comparison output being set to OFF by remote control) R   L   Y   H   I   CR   LF (Response with the status of the comparison output being set to ON for HI by remote control) R   L   Y   G   O   CR   LF (Response with the status of the comparison output being set to ON for GO by remote control) R   L   Y   L   O   CR   LF (Response with the status of the comparison output being set to ON for LO by remote control)																							6		
Comparison output remote control	R	L	Y	H	I	CR	LF																			6
	(Sets ON for HI.) R   L   Y   G   O   CR   LF (Sets ON for GO.) R   L   Y   L   O   CR   LF (Sets ON for LO.) R   L   Y   O   F   F   CR   LF (Sets all comparison outputs to OFF.)																							5		
Comparison output remote control cancellation	R	C	M	CR	LF																					3
	Y   E   S   CR   LF (Response with the status of every function not being remote-controlled) S   T   H   CR   LF (Response with the status of the hold function being remote-controlled) P   V   H   CR   LF (Response with the status of the peak hold function being remote-controlled) D   Z   R   CR   LF (Response with the status of the digital zero function being remote-controlled) R   L   Y   CR   LF (Response with the status of the comparison output function being remote-controlled) Note: The main unit responds with the statuses of functions by separating them with delimiters if multiple functions are being remote-controlled.																							5		
Remote control response	R	E	A	CR	LF																					3
	N   O   ?   CR   LF (Response with the status of every function not being remote-controlled) S   T   H   CR   LF (Response with the status of the hold function being remote-controlled) P   V   H   CR   LF (Response with the status of the peak hold function being remote-controlled) D   Z   R   CR   LF (Response with the status of the digital zero function being remote-controlled) R   L   Y   CR   LF (Response with the status of the comparison output function being remote-controlled) Note: The main unit responds with the statuses of functions by separating them with delimiters if multiple functions are being remote-controlled.																							3		
MAX/MIN(MAX-MIN) value response	M	A	X	CR	LF																					3
	M   A   X   5   0   0   0   CR   LF (Response with a MAX value) M   I   N   -   1   0   0   0   CR   LF (Response with a MIN value) M   -   M   6   0   0   0   CR   LF (Response with a (MAX-MIN) value) Note: The main unit responds with these values at one time by separating them with delimiters.																							9		
MAX/MIN(MAX-MIN) value clear	M	C	L	M	A	CR	LF																			6
	(Clears the MAX value.) M   C   L   M   I   CR   LF (Clears the MIN value.) M   C   L   M   M   CR   LF (Clears the (MAX-MIN) value.)																							5		
Range response (except for thermometers)	R	N	G	CR	LF																					3
	R   A   N   G   E   1   2   CR   LF (Response with the status of range 12 being selected) R   A   N   G   E   2   4   CR   LF (Response with the status of range 24 being selected) R   A   N   G   E   2   A   CR   LF (Response with the status of range 2A being selected) N   O   ?   CR   LF (Response with the status of no range being selected) Note: The response varies depending on the input unit or the status of range selection (8 characters max.).																							8		
Range response (thermometers)	R	N	G	CR	LF																					3
	K   A   CR   LF (Response with the status of range KA being selected) K   b   CR   LF (Response with the status of range KB being selected) J   CR   LF (Response with the status of range J being selected) T   CR   LF (Response with the status of range T being selected) R   CR   LF (Response with the status of range R being selected) S   CR   LF (Response with the status of range S being selected) B   CR   LF (Response with the status of range B being selected) P   A   CR   LF (Response with the status of range PA being selected) P   b   CR   LF (Response with the status of range Pb being selected) J   P   A   CR   LF (Response with the status of range JPA being selected) J   P   b   CR   LF (Response with the status of range JPb being selected)																							2		
Range setting	R	N	G	1	2	CR	LF																			6
	(Sets to range 12.) R   N   G   2   4   CR   LF (Sets to range 24.) R   N   G   2   A   CR   LF (Sets to range 2A.) R   N   G   K   A   CR   LF (Sets to range KA.) R   N   G   T   CR   LF (Sets to range T.) R   N   G   J   P   b   CR   LF (Sets to range JPb.) Note: The command varies depending on the input unit or the range of interest.																							5		
	Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. Y   E   S   CR   LF Note: The main unit switches to the range immediately after the setting. N   O   ?   CR   LF (Response when a nonexistent range is set.)																							5		

Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Char. Length		
Averaging frequency response	A	V	G	CR	LF																					3
	A   V   G   1   CR   LF (Response with the status of the averaging frequency being once.) A   V   G   8   0   CR   LF (Response with the status of the averaging frequency being 80 times.)																							6		
Averaging frequency setting	A	V	G	1	CR	LF																				5
	(Sets the averaging frequency to once.) A   V   G   8   0   CR   LF (Sets the averaging frequency to 80 times.)																							5		
Moving average calculation frequency response	M	A	V	CR	LF																					3
	M   A   V   O   F   F   CR   LF (Response with the status of moving average calculation being set to OFF.) M   A   V   O   N   4   CR   LF (Response with the status of the moving average calculation frequency being 4 times.) M   A   V   O   N   1   6   CR   LF (Response with the status of the moving average calculation frequency being 16 times.)																							3		
Moving average calculation frequency setting	M	A	V	4	CR	LF																				5
	(Sets the moving average calculation frequency to 4 times.) M   A   V   1   6   CR   LF (Sets the moving average calculation frequency to 16 times.) M   A   V   0   CR   LF (Cancels moving average calculation (OFF).)																							3		
Step width response	S	W	D	CR	LF																					3
	S   W   D   1   CR   LF (Response with the status of the step width being 1.) S   W   D   1   0   CR   LF (Response with the status of the step width being 10.)																							6		
Step width setting	S	W	D	1	CR	LF																				5
	(Sets the step width to 1.) S   W   D   1   0   CR   LF (Sets step width to 10.)																							5		
Communication function parameter response	R	S	-	CR	LF																					3
	R   S   -   1   9   2   0   0   -   7   -   E   -   2   -   C   R   /   L   F   CR   LF (Sets the baud rate to 19200 bps, data length to 7 bits, parity to even, number of stop bits to 2, and delimiter to CR+LF.) R   S   -   9   6   0   0   -   7   -   E   -   1   -   C   R   CR   LF (Sets the baud rate to 9600 bps, data length to 8 bits, parity to none, number of stop bits to 1, and delimiter to CR.)																							17		
Communication function parameter setting	R	S	-	1	9	2	0	0	-	7	-	E	-	2	-	C	R	/	L	F	CR	LF				21
	(Sets the baud rate to 19200 bps, data length to 7 bits, parity to even, number of stop bits to 2, and delimiter to CR+LF.) R   S   -   9   6   0   0   -   7   -   E   -   1   -   C   R   CR   LF (Sets the baud rate to 9600 bps, data length to 8 bits, parity to none, number of stop bits to 1, and delimiter to CR.)																							3		
Device ID response	A	D	R	CR	LF																					3
	0   1   CR   LF (Response with the status of the device ID being 01) 9   9   CR   LF (Response with the status of the device ID being 99)																							2		
Device ID setting	A	D	R	0	1	CR	LF																			6
	(Sets the device ID to 01.) A   D   R   9   9   CR   LF (Sets the device ID to 99.)																							5		
Analog output type response	A	O	P	CR	LF																					3
	A   .   O   U   T   O   F   F   CR   LF (Response with the status of the analog output type being OFF.) 0   -   1   CR   LF (Response with the status of the analog output type being 0-1 V.) 0   -   1   0   CR   LF (Response with the status of the analog output type being 0-10 V.) 1   -   5   CR   LF (Response with the status of the analog output type being 1-5 V.) 0   -   2   0   CR   LF (Response with the status of the analog output type being 0-20 mA.) 4   -   2   0   CR   LF (Response with the status of the analog output type being 4-20 mA.) N   O   ?   CR   LF (Response with the status of the analog output unit being not installed.)																							9		
Analog output type setting	A	O	P	O	F	F	CR	LF																		7
	(Sets the analog output type to OFF.) A   O   P   0   -   1   CR   LF (Sets the analog output type to 0-1 V.) A   O   P   0   -   1   0   CR   LF (Sets the analog output type to 0-10 V.) A   O   P   1   -   5   CR   LF (Sets the analog output type to 1-5 V.) A   O   P   0   -   2   0   CR   LF (Sets the analog output type to 0-20 mA.) A   O   P   4   -   2   0   CR   LF (Sets the analog output type to 4-20 mA.)																							5		
Digital zero backup status response	B	D	Z	CR	LF																					3
	B   D   Z   O   N   CR   LF (Response with the status of digital zero backup being ON.) B   D   Z   O   F   F   CR   LF (Response with the status of digital zero backup being OFF.)																							6		
Digital zero backup control	B	D	Z	O	N	CR	LF																			6
	(Sets digital zero backup to ON.) B   D   Z   O   F   F   CR   LF (Sets digital zero backup to OFF.)																							5		
Digital zero data save command	S	A	V	CR	LF																					3
	N   O   ?   CR   LF (Response with the status of digital zero backup being OFF.)																							5		
Input selection response	I	S	E	L	CR	LF																				4
	O   .   C   CR   LF (Response with the status of the input selection option being "open collector.") L   O   G   CR   LF (Response with the status of the input selection option being "logic.") M   A   G   CR   LF (Response with the status of the input selection option being "magnet.") N   O   ?   CR   LF (Response with the status of the frequency measurement unit not being installed.)																							3		
Input selection setting	I	S	E	L	O	.	C	CR	LF																	8
	(Sets the input selection option to "open collector.") I   S   E   L   L   O   G   CR   LF (Sets the input selection option to "logic.") I   S   E   L   M   A   G   CR   LF (Sets the input selection option to "magnet.")																							5		
	Y   E   S   CR   LF (Response with the status of the frequency measurement unit not being installed.)																							5		