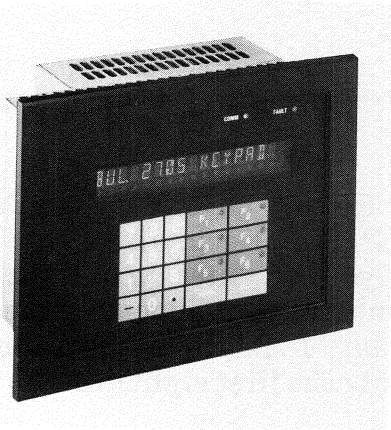

Product Data

Bulletin 2705 RediPANEL™ Keypad Modules

Features

The Bulletin 2705 RediPANEL™ Keypad Module is an operator module that connects directly to an Allen-Bradley PLC controller via the remote I/O link. It provides the capability for operators to input to and retrieve data from the PLC controller. It also functions as a single line message display. The Keypad module supports the following features:

- Sixteen character alphanumeric display.
- Numeric keypad with keys for DELETE, ENTER, Decimal, and Polarity.
- Six membrane push buttons with LED indicators.
- Remote I/O networking. Up to 16 modules can be located along a single cable up to 10,000-feet away from the PLC controller.
- On-board Message Storage and Message Editor.
- NEMA Type 4X rating when panel mounted.
- Security key switch option.
- Complete diagnostics.
- Binary, BCD and Integer data types.

Applications

- Replaces thumbwheels.
- Allows operators to enter numeric data to a PLC controller.
- Displays PLC controller data.
- Provides a single line message display that can:
  - Prompt operators
  - Display alarm messages
  - Display machine / process status
- Alarm annunciator with acknowledgment capabilities.

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Supersedes Publication 2705-2.1 Dated December, 1987

40061-027-01(B)

How the Module Operates

Operator Data Input

The Bulletin 2705 RediPANEL™ Keypad module features a numeric keypad with DELETE, ENTER, Decimal, and Polarity keys. Using the keypad, you can enter up to eight (8) digits (seven digits for signed numbers), that appear on the right side of the 16 character display. If an attempt is made to enter more than eight digits, only the first eight are accepted.

If mistakes are made while entering data, the display can be cleared one character at a time by depressing the DELETE key. The data is not transmitted to the PLC controller until the ENTER key is depressed. The DECIMAL POINT key allows you to enter decimal numbers.

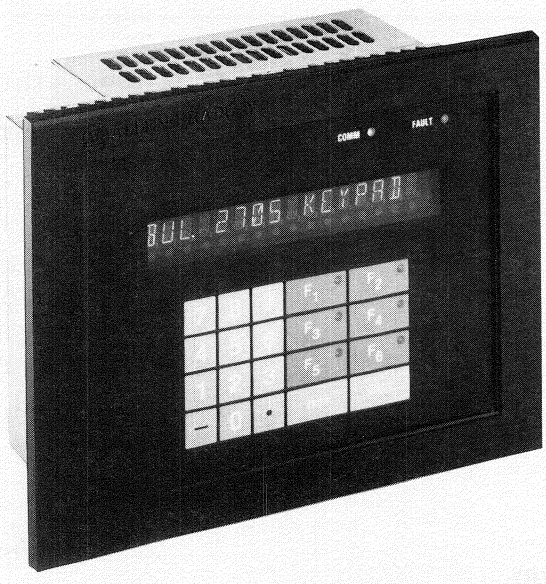
Six user-definable function keys are also provided. These keys can be used for:

- Selecting the type of information to be entered through the keypad. For example, F1 could indicate the product number of an item to be manufactured. F2 could then be used to indicate the unit number of parts to be made.
- Acknowledging alarm messages.
- Any momentary push button function.

Each function key features an LED. The LEDs are output signals that you can program similar to a pilot light.

A terminal block is provided for hard wiring a security key switch. When the Normally Open contact is closed, it locks out the functionality of the numeric keypad, but allows the use of the function keys.

Information Display



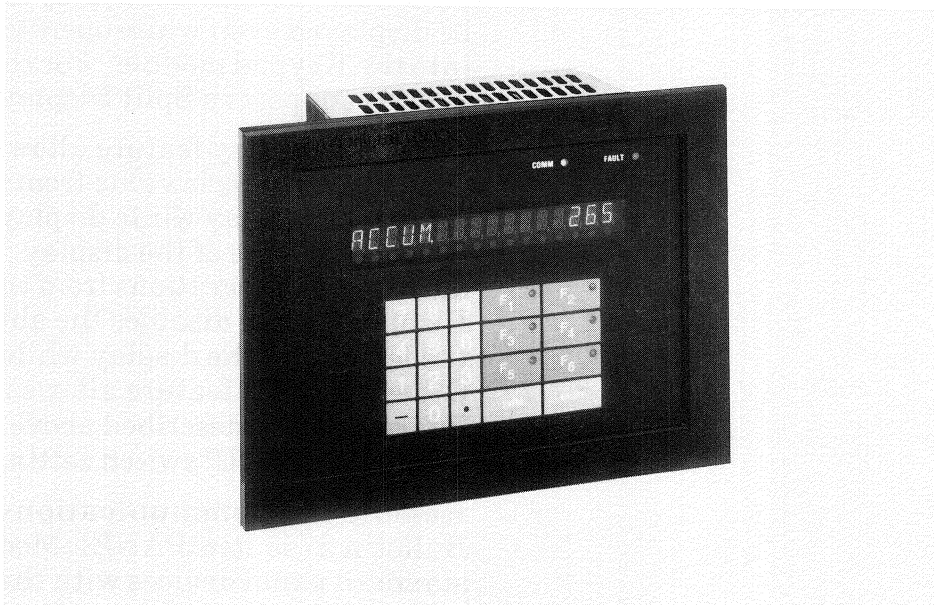
How the Module Operates (cont'd)

Information Display (cont'd)

The module can display any one of the following combinations of information at any one time:

1. All alphanumeric data. This can consist of either:
   a. Up to 12 ASCII characters from PLC controller, or
   b. A single line, sixteen character stored message inside the module. Up to 120 single line messages can be stored on EEPROM inside the module. To create and edit messages, the module features a built-in message editor. The editor is accessed by plugging an IBM-XT keyboard (or compatible) into the receptacle located on the back of the module.

In this manner, the Keypad module can display text to inform and prompt operators. It can also be used to display alarm messages that are stored as message numbers inside the module.



2. All numeric data, representing one variable. This is displayed in the right most eight positions on the display. Numeric data can consist of either:
   a. Up to eight digits of input from the keypad, or
   b. Up to eight numeric digits from the PLC controller.

The module can support three data-type formats for numeric data: binary, BCD, and integer. The data type is selected via a DIP switch on the module. Binary and BCD modes apply to the PLC-2 family of processors. Data type formats for the PLC-3 and PLC-5 controllers can be either binary, BCD, or integer.

How the Module Operates (cont'd)

3. A combination of ASCII and numeric data. Up to eight characters of ASCII data are displayed on the left side of the display and eight digits of numeric data are displayed on the right side of the display. This allows you to label numeric data with text.

   The ASCII data can consist of either eight characters from the PLC controller or the first eight characters of a stored message. The eight digits of numeric data can represent either operator input from the keypad or eight characters from the PLC controller.

4. Two PLC controller variables. This is actually a version of #3. The right eight positions display a numeric value directly from the PLC controller. The left eight positions simultaneously display a variable that has been converted to ASCII representation. This conversion is done inside the PLC program.

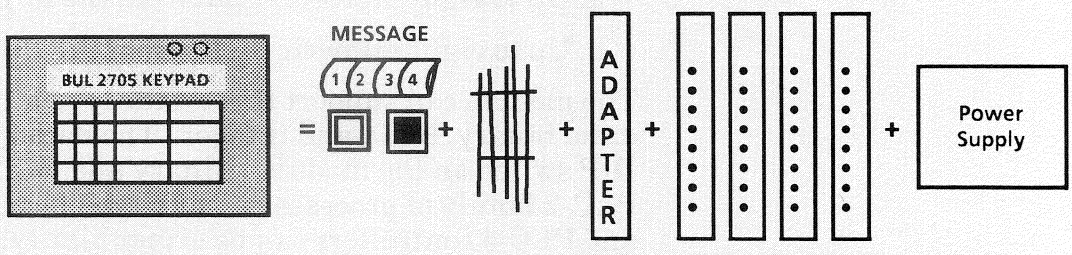
In some applications, it is desirable that a critical PLC controller variable be displayed at all times. The value must be displayed even while operators are inputting new data into the Keypad module. For these applications, the Keypad module supports a Split Display feature.

The Split Display feature allows the module to display an eight digit numeric value from the PLC controller on the left side of the display while displaying the operator input digits on the right side of the display. This feature is activated only during input operations from the keypad. Selecting the Split Display feature disables the ability to display ASCII text on the left side of the display while an operator is entering data. Otherwise, this feature allows the module to display information as described above. The Split Display feature is selected via a DIP switch setting on the Keypad module.

Remote I/O Communications

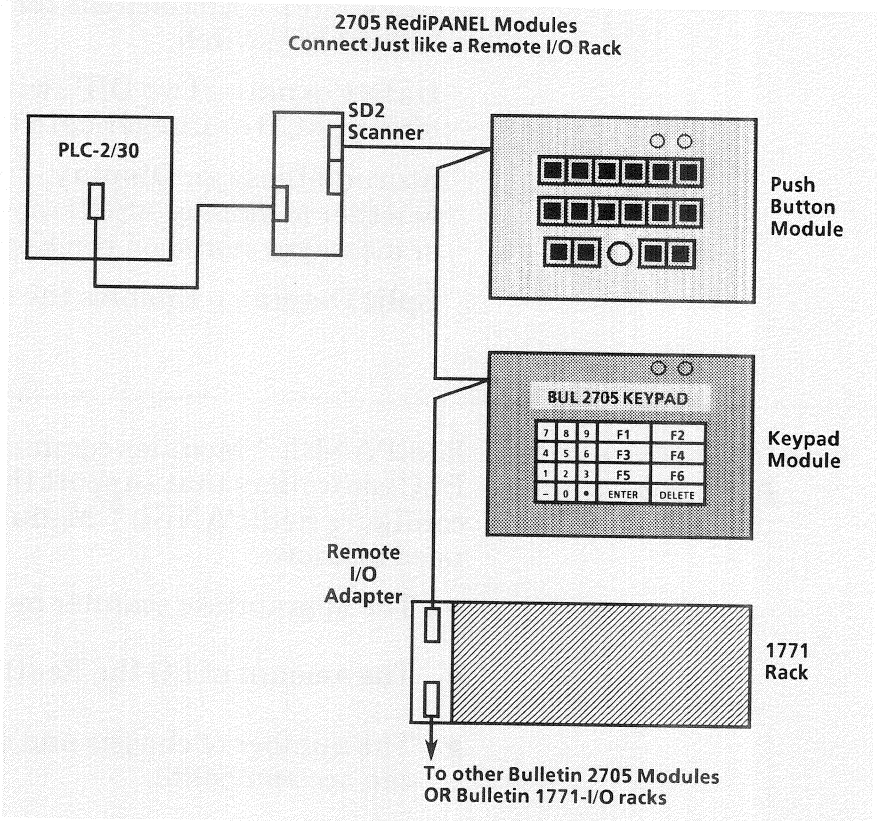
Bulletin 2705 RediPANEL Modules combine the functions of standard panel devices with the capabilities of a remote I/O rack – all in one package.

2705 RediPANEL™ Modules
Combine Thumbwheels and Push Button Operator Stations with Remote I/O



How the Module Operates (cont'd)

RediPANEL Modules connect to remote I/O scanners and sub-scanners just like remote I/O racks. This replaces large wire bundles with a single twin-axial cable that connects the module to the programmable controller. Up to sixteen separate modules can be located on a single cable up to 10,000 feet away from the programmable controller.



The modules are addressed through DIP switch settings in the same manner as remote I/O racks. Additional DIP switches allow you to select the following features:

Last State – When enabled, the display retains its last message if communications are lost to the module. If disabled, the display is blanked.

Handshake – RediPANEL™ Modules have a standard TIMED feature that holds all keypad entries for a minimum of 100 milliseconds to allow the PLC controller to read the depression during its scan cycle. No special programming is needed for this function. Most system configurations can use this feature to insure the data-capture of a button depression.

However, for complex system configurations with a long program, multiple block transfers, or a large number of I/O scanned, the 100 millisecond hold may not be a sufficient length of time to be received by the PLC controller. In this case, the HANDSHAKE feature can be selected to insure that rapid keypad entries are not missed.

How the Module Operates (cont'd)

The Handshake feature holds depressions until the module receives acknowledgment from the PLC controller that it has received the depression. The Handshake feature is selected via a DIP switch setting on the RediPANEL™ Keypad Module.

Keyswitch – Enables the terminal block for the security lockout keyswitch.

Data Format – Two DIP switches are used to select either binary, BCD or integer data types.

Stored Message Display – When enabled determines whether to display ASCII messages from the PLC controller or messages stored on the Keypad module's EEPROM.

Split Display – Enables the split display feature.

Configuration with PLC Controllers

RediPANEL™ Modules communicate with all Allen-Bradley PLC controllers that support the Remote I/O link. To configure RediPANEL™ Modules with PLC controllers you need to know:

- The appropriate scanner module for the PLC controller.
- The amount of I/O the RediPANEL module uses.
- The number of chassis and amount of I/O that the scanner can accommodate.

The modules communicate with the PLC controllers through remote I/O scanners and sub-scanners. The modules contain all of the necessary electronics to connect directly to the remote I/O cable which originates from a scanner or sub-scanner module. The scanners themselves have both physical and logical limitations. The physical limitations refer to the number of separate chassis (I/O racks, drive systems, or RediPANEL™ Modules) the scanner can accommodate. The logical limitations refer to the amount of I/O the scanner can address.

Table 1 on Page 7 shows the corresponding scanner for each PLC controller. Note that all the controllers can support the Sub I/O Scanner (1771-SN) installed in an I/O rack.

Configuration with PLC Controllers (cont'd)

Table 1
Selecting a Scanner Module

For this PLC Controller:	Use this Scanner Module
PLC-2-MINI	1771-SN
PLC-2/30	1772-SD2, Rev. 3 or later
PLC-3	1775-S4A, -S4B, -S5
PLC-3/10	1775-SR, -SR3
PLC-5/12	1771-SN
PLC-5/15 or 5/25	Integral

The remote I/O network is measured in terms of "racks". The smallest unit is a 1/4 rack. Rack sizes relate to the amount of I/O as shown in Table 2.

Table 2
Rack Size Related to I/O

Rack Size	Amount of I/O (Bits)
1/4	32
1/2	64
3/4	96
1	128

Rack sizing also relates to the amount of Input Image Table and Output Image Table space that the module uses. Once you determine the amount of I/O rack space you will require, (Refer to Table 3), you can set the appropriate DIP switches for any rack size as shown in Table 2.

Table 3
Rack Sizing for 2705 Keypad Module Functions

Rack Size	Stored Message Capability	BCD Mode		Binary or Integer Mode (8 Digits)	Number of Destination Bits
		Number of BCD Digits	Number of ASCII Characters from PLC	Number of ASCII Characters from PLC	
1/4 Rack	No	6	0	0	0
1/2 Rack	BCD = No Others = Yes	8	2	4	16
3/4 Rack	Yes	8	6	8	BCD = 32 Others = 48
Full Rack	Yes	8	10	12	BCD = 64 Others = 80

Configuration with PLC Controllers (cont'd)

Once you have selected the appropriate scanner for your PLC, Table 4 will show you how many separate chassis the scanner can support and how much I/O it can address.

For any given application, the total of all of the I/O used by each chassis (I/O rack, drive system or RediPANEL™ Module) connected to the Remote I/O Link gives the amount of Full Racks of I/O being supported by the scanner or sub-scanner for that application.

Table 4
Scanner Capacities for Chassis and I/O

	SCANNERS		SUB-SCANNERS	
	Physical	Logical	Physical	Logical
PLC-2-Mini 2/05 2/07 2/15 2/17	----	----	16 Chassis ①	7 Racks
PLC-5/12	----	----	16 Chassis ①	7 Racks
PLC-5/15 ②	16 Chassis	3 Racks	16 Chassis ①	7 Racks
PLC-5/25 ③	16 Chassis	7 Racks	16 Chassis ①	7 Racks
PLC-2/30	16 Chassis/ channel 2 Channels /scanner	7 Racks total	16 Chassis ①	7 Racks
PLC-3	16 Chassis/ channel 4 Channels /scanner	32 Racks total	16 Chassis ①	7 Racks

NOTE – (1) Logical "Full Rack" = (4) "Quarter Racks".
① Two of these can be Bulletin 1771 chassis.
② PLC-5/15 Series B Revision H or later have partial rack addressing. Earlier versions were limited to (3) chassis.
③ PLC-5/25 Series A Revision D or later have partial rack addressing. Earlier versions were limited to (7) chassis.

Programming the Module

Applications for the Keypad Module are programmed in the Allen-Bradley PLC controller. The Keypad module has an on-board message editor that creates and stores up to (120) 16 character messages. These messages are triggered from the program in the PLC controller.

All operations of the module – inputting data, displaying a PLC register value, displaying a message, and using the function keys – correspond to fixed bit and word locations in the Input and Output Image Tables of the PLC controller.

Programming the Module (cont'd)

For example, depressing a Function key sends a "1" to its corresponding bit in the Input Image Table. Depressing the ENTER key sends the number that the operator has input through the numeric keypad to a fixed word location in the Input Image Table. To display a register's contents you put that value into a word in the Output Image Table.

To display a message that is stored in the module, you send its message number through a word in the Output Image table.

The message editor inside the module is accessed by plugging an IBM/XT keyboard into the receptacle located in the back of the module. A prompt appears on the display to begin the editing process. The Message Editor contains commands to create, edit, and save single line, 16-character alphanumeric messages. Each message is assigned a message number for reference by the PLC controller or for future editing.

Typical Input and Output Image Table Configuration

Table 5 below shows a typical I/O image table configuration when using a Keypad module with a PLC-5/15 or PLC-5/25.

In this configuration the Keypad module has been set for Integer mode, 1/2 Rack with stored message capability. The word addresses given are for a Keypad module configured as Rack 2 with the starting addresses beginning with Module Group 0.

Integer Mode, 1/2 Rack with Stored Message Display

Input Image Table

Bits	17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
	H	EN	F6	F5	F4	F3	F2	F1	–	Dec. Pos.			–	–	–	–
	Integer Data															
	Destination															
	Destination Bits															

INPUT	RACK #	MODULE GROUP (WORD)
I:	02	0
I:	02	1
I:	02	2
I:	02	3

Output Image Table

Bits	17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
	H	DM	L6	L5	L4	L3	L2	L1	–	Dec. Pos.			DC	SDP		
	Integer Data															
	Stored Message Display Number (SMD) - BCD only															
	Two Alphanumeric Characters															

OUTPUT	RACK #	MODULE GROUP (WORD)
O:	02	0
O:	02	0
O:	02	0
O:	02	0

EXAMPLE – The address for the function key "F1" in this example would be I:020/10.

Specifications

FUNCTION
Provides keypad interface for data entry and display in Remote I/O Serial Data Link.

POWER AND ENVIRONMENTAL
Power Supply: Integral power supply in each module.

Operating Ranges:
90-132 Volts AC, 47-63 Hz
180-265 Volts AC, 47-63 Hz
18-30 Volts DC

Input Current and Power Ratings:
24 Volts DC, 15VA, 625 milliamperes
120 Volts AC, 15VA, 125 milliamperes

Temperature Range:
Operating: 0°C to + 60°C

Storage: -40°C to + 85°C

Humidity: 5%-95% non-condensing

NOTE – Operating temperature at 0°C is based on the absence of freezing moisture or liquids.

COMMUNICATIONS
Remote I/O Serial Data Link: Communicates with the Allen-Bradley PLC controller family via the following scanner modules:

Scanner Catalog No.	PLC Controller
1771-SN	PLC-2-MINI
1772-SD2 ①	PLC-2/30
1775-S4A, S4B, S5	PLC-3
1775-SR, SR5	PLC-3/10
1771-SN	PLC-5/12
Integral	PLC-5/15 or PLC-5/25

① Scanner 1772-SD2, Rev. 3 or later.

Communication Media:
Allen-Bradley 1770-CD (Belden Cable 9463)

Baud Rates:
Selectable – 115.2K baud (5000-ft.) or 57.6K baud (10,000-ft.)

Interconnect: 3-terminal plug and socket

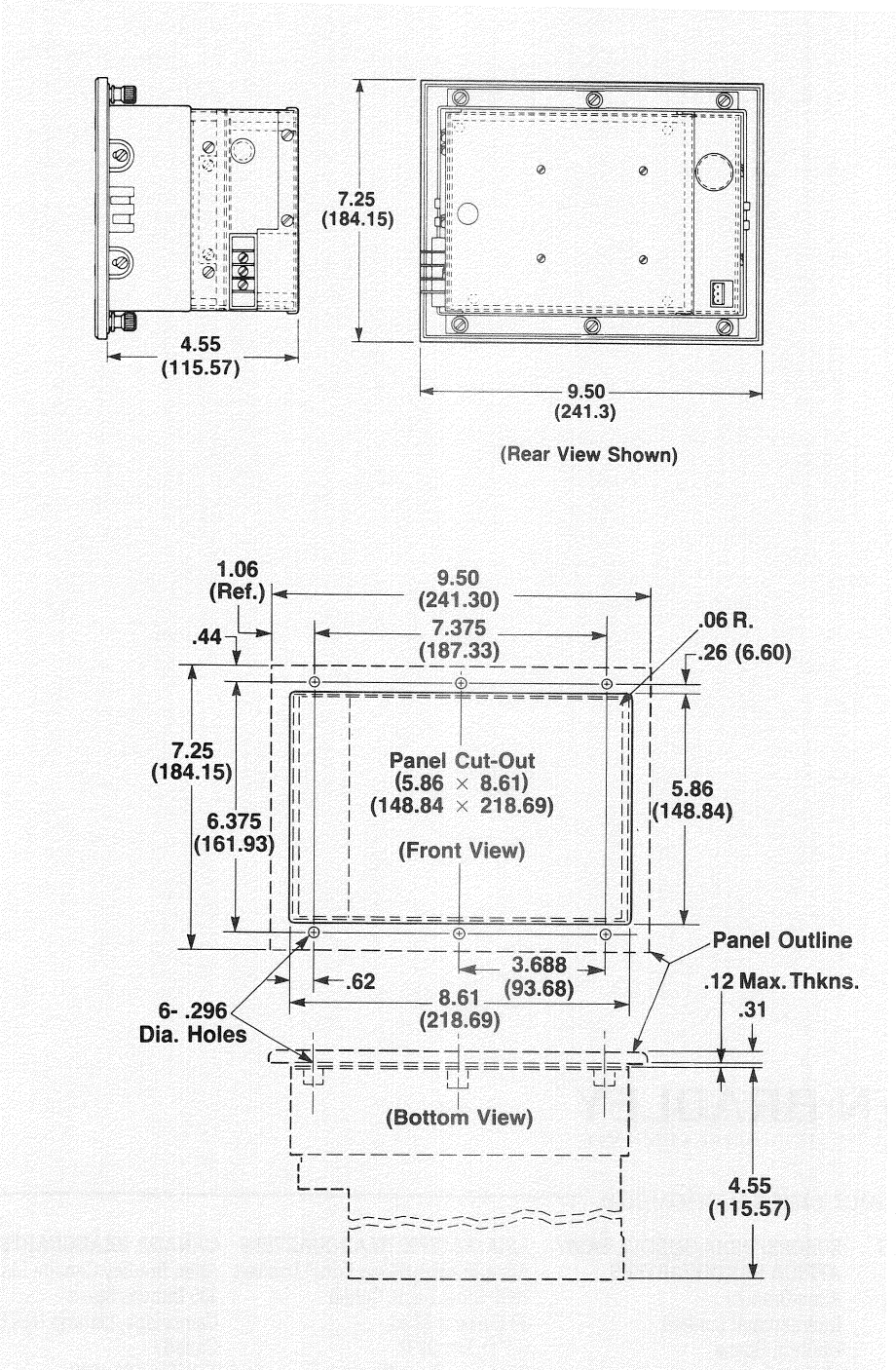
CONSTRUCTION – NEMA Type 4X

KEYBOARD COMPATIBILITY
Series A or later: IBM-compatible XT-style keyboard, DIN 5-pin plug
Series B or later: IBM-compatible AT and XT-style keyboard ②

② The degree of compatibility varies between manufacturers. The following IBM-AT or XT compatible keyboards have been tested for use with the Bulletin 2705 Keypad Module:
IBM-AT or XT keyboards
Allen-Bradley Catalog No. 1784-T50 keyboard
Tandy 3000 keyboards

Approximate Dimensions

All dimensions are in inches.
(Dimensions in parentheses are in millimeters).



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