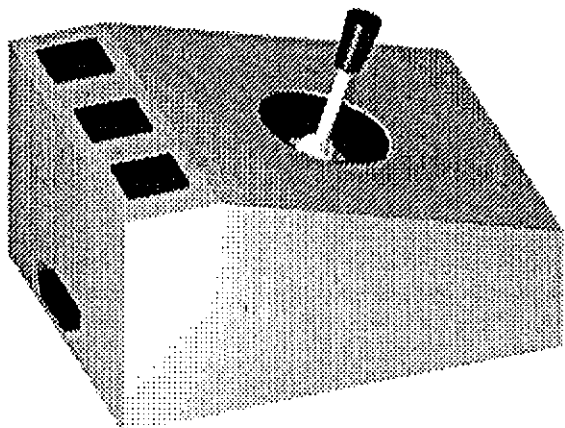


Daedal

JS6000 Joystick USER GUIDE



Compumotor



Important User Information

Motion control system equipment must be installed and operated such that all applicable safety requirements are met. It is the user's responsibility to identify all potential safety hazards and take precautions to deal with them. Failure to do so may result in damage to equipment and injury to personnel. This user guide should be thoroughly reviewed before installing or operating the equipment.

Under no circumstances will Parker Hannifin Corporation be liable for any incidental, consequential or special damages of any kind whatsoever, including but not limited to lost profits arising from or in any way associated with the use of the equipment or this user guide.

Safety Warning!

High performance motion control equipment is capable of producing rapid movement and high forces. Unexpected motion may occur especially during the development of controller programs. **KEEP CLEAR** of any machinery driven by stepper or servo motors and never touch them while they are in operation.

High voltages are present within the electrical enclosures, on back planes and on some connector terminals. **KEEP CLEAR** of these areas when power is applied to the equipment.

Parker Hannifin constantly strives to improve all of its products. We reserve the right to modify equipment and user guides without prior notice.

js6000-1b



Daedal Division of Parker Hannifin 1995

JS6000 Joystick User Guide

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General Information

The JS6000 is a two channel analog joystick which is designed to interface with all 6000 Series programmable motion controllers. This unit is capable of simultaneous control of any two motorized axes connected to the 6000 Series host. Motor speed control with the JS6000 is proportional to the degree of joystick deflection; greater deflection produces higher velocity. A command subset of the 6000 series programming language allows the user to completely specify all move parameters for motion initiated under joystick control. These include: acceleration, deceleration, velocity range and axis pair selection.

The panel mounted SELECT switch is factory configured to allow the operator to manually choose either one of two user programmable velocity ranges which may be defined with the 6000 Series commands JOYVH and JOYVL. A high speed range is normally defined for rapid traverse while the low speed range can be optimized for fine positioning. A simple wiring modification to the interconnect cable allows the SELECT switch to enable four axis operation instead of high / low velocity range choice capability. Details concerning this option can be found in the *Installation* section on pages 4-5.

Sensitivity of the JS6000 may be controlled through programmed selection of the center deadband and the center voltage signal level of the analog input. The panel mounted RELEASE switch enables / disables joystick operation. This switch is set to the ON position prior to

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enabling joystick operation. Command authority is transferred to the JS6000 upon issuance of the joystick enable command by the host 6000 control. The OFF position releases command authority from the JS6000 to the associated 6000 controller. Joystick function can also be terminated with control authority returning to the 6000 Series host by means of software commands.

A panel mounted spring return TRIGGER switch provides a momentary contact for programmed interaction with the 6000 series host controller. For example, 6000 series program subroutines in conjunction with JS6000 trigger inputs provide the host controller with the capacity to capture and store a series of coordinate positions in order to describe a motion path. By this technique, the task of programming a complex path can be greatly simplified. Further information on this capability may be found in the "Teach Mode" section of *6000 Series Software Reference Guide*.

What You Should Have

The complete JS6000 ship kit includes the following items:

Joystick control unit - part number JS6000
Interconnect cable - part number 006-1443-10*
Warranty / product registration card
User Guide

Any deficiencies, damages to the shipping carton or to the contents should be noted and reported to:

Customer Service Department
Parker Hannifin - Daedal Division
Harrison City, Pennsylvania U.S.A.
Telephone: (412) 744 - 4451
(800) 245 - 6903
Facsimile: (412) 744 - 7626

Please complete and mail the enclosed postage paid warranty / registration card. Completion and return of the card will allow us to provide you with all pertinent update information and service bulletins concerning this product.

* Standard length is 10'. The last two digits of the part number indicate cable length in feet.

Installation

All required controller interface hardware is provided in the JS6000 kit. Installation simply entails coupling the interconnect cable to the JS6000 (15 pin D style connector mating to socket connector on rear chassis of the joystick) then attaching the free end of the cable (25 pin D connector) to the joystick socket connector on the 6000 Series controller. The standard interconnect cable length is 10 ft (3 meter). Cables are available in optional lengths to a maximum of 50 ft. (15 meter). See the *Hardware* Section for specifying non standard cable length.

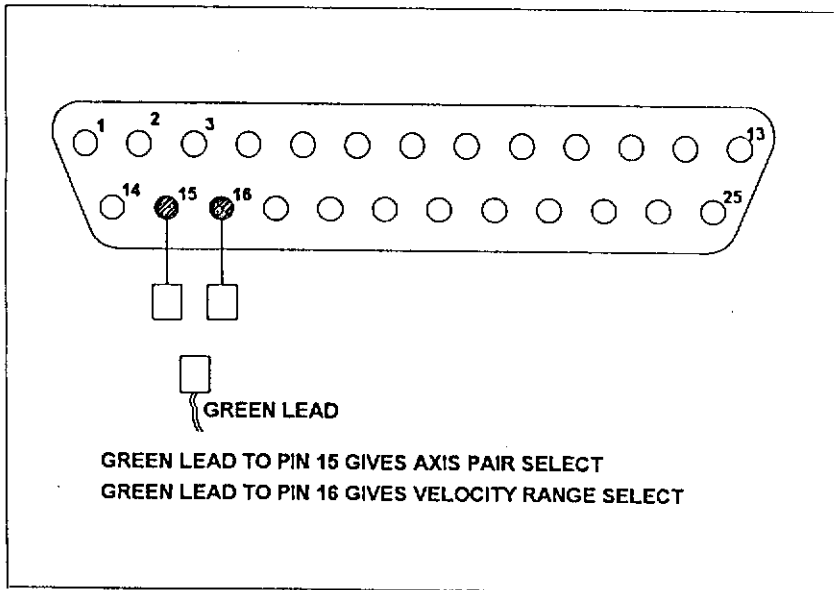
If high / low velocity range capability is not required, the SELECT switch may be utilized to provide the alternative of four axis control (two axes simultaneous) capability. This function change is accomplished by modifying the interconnect cable by the following procedure:

Open the outer shell of the 25 socket D connector by removing the two screws which secure the connector shell halves. Note that sockets 15 and 16 are fitted with miniature spade lug connectors. If the green wire is connected to socket 16, the SELECT switch provides the choice of two velocity ranges. To provide axis pair selection, disconnect the green wire spade lug from socket 16 and reconnect it to the spade lug attached to socket 15. Replace the outer connector shell, reassembling it with the securing screws. Please refer to the *Interface Cable Wiring Diagram*, as shown on the following page, when making this modification.

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With this wiring change, the conventional setup assigns axes 1 & 2 to SELECT switch position A and axes 3 & 4 to SELECT switch position B. However, with the appropriate joystick setup via the 6000 Series programming commands, any axis pair combination can be configured for each of the two SELECT switch settings. See the *Joystick and Analog Input Connections* section of the appropriate 6000 Series Controller User Guide and the *6000 Series Software Reference Guide*.

Figure 1



Operation

The host 6000 Series controller requires that the joystick commands must first be configured, preferably in the host controller setup program. The following parameters must be defined in the 6000 Series host to provide functional joystick capability.

JOYVL	Low speed range of joystick controlled moves
JOYVH	High speed range of joystick controlled moves
JOYA	Acceleration of joystick controlled moves
JOYAD	Deceleration of joystick controlled moves
JOYAXL	Axis pairs for joystick operations
JOYAXH	Axis pairs for joystick operations

Defaults for all of these parameters are applied in the absence of any user specified inputs. Please refer to the *6000 Series Software Reference Guide* for parameter default values.

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Joystick Setup Example

The following is an example of a setup program to define the necessary joystick parameters.

Parameter	Description
DEF SETUP	Initialization of 6000 Series host All pertinent setup commands go here. See 6000 Series User Guide for controller setup
SCALE0	Scaling not enabled. All move are specified as motor revolutions
JOYAXH1,2,0,0 *	When axis select input is high (active), analog channel 1 controls axis 1; analog channel 2 controls axis 2,; analog channels 3 & 4 are not in use
JOYAXL0,0,1,2 *	When axis select input is low (inactive), analog channel 1 controls axis 3; analog channel 2 controls axis 4; analog channels 1 & 2 are not in use
@JOYA100	Joystick acceleration: Here set to 100 rev / sec ² on all axes

* Toggling the axis select input on the joystick connector could cause the analog inputs to control different axes in one state versus the other. See JOYAXH and JOYAXL commands in the 6000 Series Software Reference Guide

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@JOYAD200 Joystick deceleration: Here set to
200 rev / sec² on all axes

@JOYCDB0.25 Set center deadband to +/- 0.25
Volts on all analog channels

@JOYEDB0.5 Set end deadband to 0.5 Volts on all
analog channels (limits usable
voltage range to 0.5-2.0 Volts)

@JOYCTR1.25 Set joystick center at 1.25 Volts for
all analog channels

JOYVL1,1,2,2 ** Joystick low velocity range maximum
when velocity select input is low.
1 rev / sec on axes 1 & 2; 2 rev / sec
on axes 3 & 4

@JOYVH10 ** Joystick high velocity range
maximum when velocity select input
is high. Here set to 10 rev / sec on
all axes

JOY1,1,1,1 Enable joystick mode for all axes

END

** Toggling the axis select input on the joystick connector will cause analog inputs 1 and 2 to control axes 1 and 2 in one state and axes 3 and 4 in the other state.

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If the cable has been modified as described in the *Installation* section above to enable the SELECT switch to provide four axis operations in pairs, then the velocity range defined by the JOYVH command will not be active.

Once these parameters are defined and the JS6000 panel mounted RELEASE switch is set to the ON position, the joystick may be enabled by the issuance of a JOY command by the 6000 Series host. For example; JOY1111 enables joystick function for all four axes. Program flow can conditionally branch to a JOY command when a user defined variable reaches predetermined count / value or upon receipt of a specific interrupt or programmable input configuration. The host 6000 controller program can hand over command authority to the JS6000 as part of an interactive routine requiring operator input.

In any case, command authority will reside with the JS6000 until the joystick function is disabled in either of two ways. Command authority of the JS6000 may be terminated by the host controller issuing an appropriate JOY command. For example, JOY0000 disables joystick command authority for all four axes. Alternately, by toggling the JS6000 RELEASE switch to the OFF position, the operator may manually relinquish command authority to the host controller. The host 6000 Series control assumes command authority at the next successive command line.

NOTE: The Release switch must be in the ON position before the JS6000 can be enabled by issuing the JOY command.

Hardware

Joystick

Potentiometers: 5K Ohm (1K change over full range)

Full Scale Deflection: +/- 27° on each axis

SELECT switch: Two position rocker type;
Contact rating: 1A @ 120 VAC
or 1A @ 28 VDC
Factory set to provide for manually selecting either of two programmed velocity ranges. Rewiring the lead from pin 16 to pin 15 in the 25 pin cable D connector provides the alternative of axis pair selection capability.

RELEASE switch: Two position rocker type;
Contact rating: 1A @ 120 VAC
or 1A @ 28 VDC

Release ON allows joystick to be enabled by the host 6000 series controller.

Release OFF disables the joystick returns command authority to host.

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TRIGGER switch: Momentary contact push button
Contact Rating: 1A @ 120 VAC
or 1A @ 28 VDC.
Switch status is used to control
program flow.

Chassis connectors: D style 15 sockets on JS6000
rear panel.

**Controller interconnect
cable** Part number 006-1443-10
Standard length: 10 ft (3 meter)
Host Controller end: D style 25
pin contacts JS6000 end: D style
15 pin contacts. See Interface
Cable Wiring Diagram on pages
13-14.

*Note: Cable may be lengthened to a
maximum of 50 ft. (15 meters).
Optional cable lengths are available in
one foot (300 mm) increments; the last
two digits of the part number specify
the cable length in feet.*

Input Power + 5 VDC @ 5 mA max.
provided by 6000 host via the
interconnect cable

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Equipment Specifications

Operating Temperature ¹	40° F to 125° F (4° C to 50° C)
Storage Temperature	-22° F to 185° F (-30° C to 85° C)
Humidity	0 to 95% non - condensing
Life	1 million full scale deflections per axis

¹ Note: The JS6000 is factory calibrated for operations at 68° to 72° F (20° - 22° C). Deadband and sensitivity should be adjusted for ambient operating temperatures to insure drift free operations. If software commands do not provide sufficient authority to control drift at extreme operating temperatures please consult Daedal / Compumotor applications engineering.

Connector & Cable Wiring

Interface Cable 006-1443-xx Wiring Diagram

25 pin "D" connector
(Mates to 6000 control)

15 pin "D" connector
(Mates to JS6000)

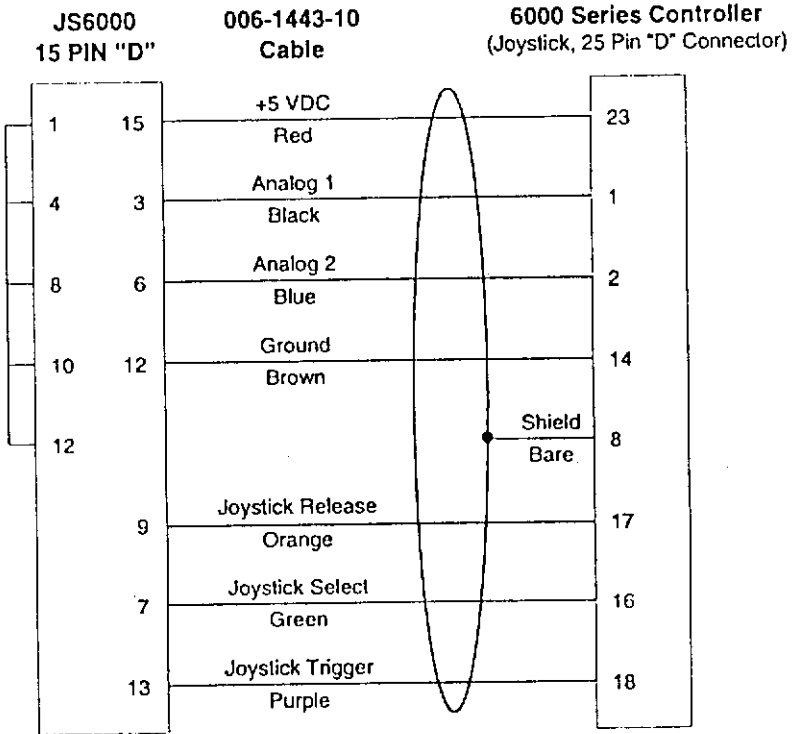
Pin #	Description	Wire Color	Pin #
1	Analog 1	Black	3
2	Analog 2	Blue	6
8	Shield	Bare	
14	Ground	Brown	12*
15	Select Axes**		
16	Select Velocity**	Green	7
17	Release	Orange	9
18	Trigger	Purple	13
23	+ 5 VDC	Red	15

* Sockets 1,4,8,10 of the JS6000 chassis connector jumper to socket 12 chassis ground.

** Jumper selectable - see pages 4-5

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Figure 2



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Chassis Connector Data

15 socket "D" type
On rear panel of JS6000

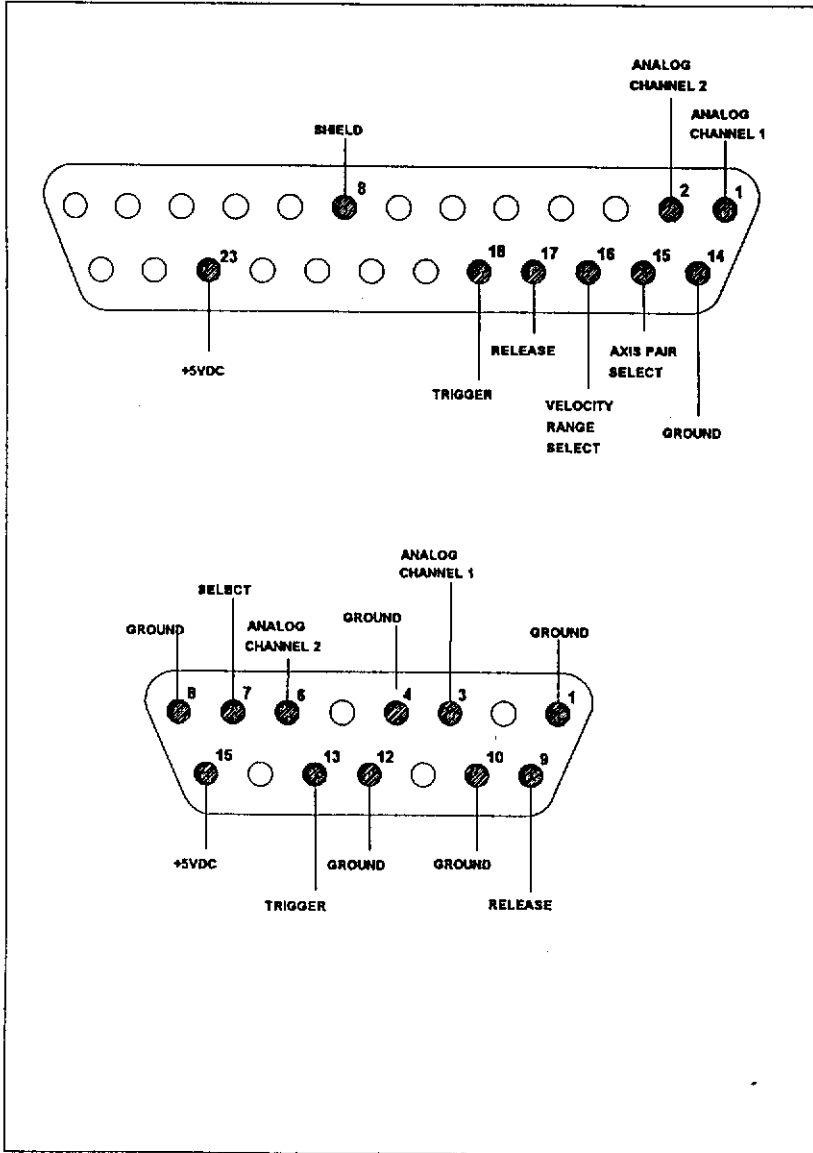
25 socket "D" type
On 6000 Series
host control

Socket #	Function	Function
1	X axis pot., positive leg	Analog Channel 1
2	X axis pot., negative leg	Analog Channel 2
3	X axis pot., arm	Analog Channel 3
4	Y axis pot., positive leg	No Connection
5	Y axis pot., negative leg	" "
6	Y axis pot., arm	" "
7	SELECT switch contact	" "
8	SELECT switch contact, common	Shield
9	RELEASE switch contact	No Connection
10	RELEASE switch contact, common	" "
11	TRIGGER switch N.C. contact	" "
12	TRIGGER switch common contact	" "
13	TRIGGER switch N.O. contact	" "
14	No connection	Ground
15	+ 5 VDC input	Axes Select**
16	-	Velocity Select
17	-	Joystick Release
18	-	Joystick Trigger
19	-	Joystick Auxiliary
20	-	No Connection
21	-	" "
22	-	" "
23	-	+ 5 VDC output
24	-	No Connection
25	-	" "

** Toggling Axes Select input on the Joystick connector can cause the analog inputs to control different axes in one state versus the other. See JOYAXH and JOYAXL commands in the *6000 Series Software Reference Guide*

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Figure 3



Joystick Commands

The following is a complete list of commands pertinent to JS6000 operation. Complete details of all commands relevant to joystick function will be found in the *6000 Series Software Reference Guide*.

JOY	Joystick enable / disable
JOYA	Acceleration of joystick controlled moves
JOYAA	Joystick Average Acceleration
JOYAD	Deceleration of joystick controlled moves
JOYADA	Joystick Average Deceleration
JOYAXH	Axis pairs for joystick operations
JOYAXL	Axis pairs for joystick operations
JOYEDB	Joystick End Deadband
JOYVH	High speed range of joystick controlled moves
JOYVL	Low speed range of joystick controlled moves
JOYZ	Joystick Zero

Obtaining Assistance

Applications questions concerning the JS6000 joystick or other 6000 Series motion controls should first be directed to the Automation Technology Center (ATC) from which the product was purchased. Applications assistance with the JS6000 may also be obtained by telephone contact with either the Daedal or Compumotor divisions. Applications inquiries should be directed to the divisions as follows:

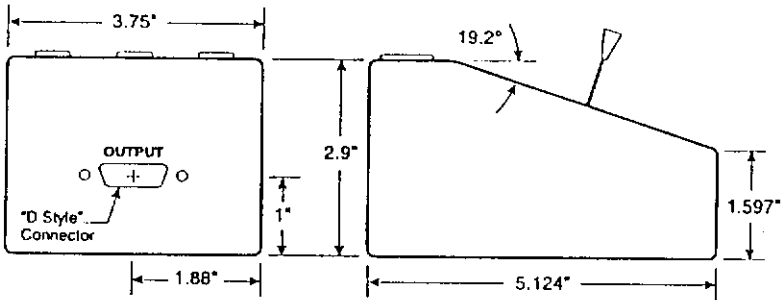
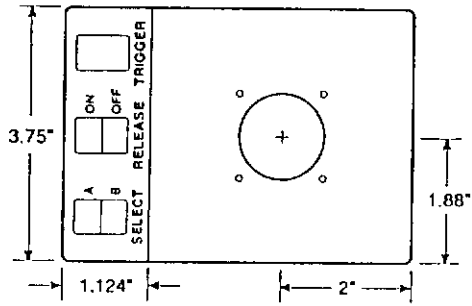
Customer Service
Department
Daedal Division
Harrison City, Pa.
(800) 245 - 6903
(412) 744 - 4451
Fax: (412) 744 - 7626
Hours: 8:00AM-5:00PM
Eastern Time

Applications
Engineering Dept.
Compumotor Division
Rohnert Park, Ca.
(800) 358 - 9070
(707) 584 - 7558
Fax: (707) 584 - 8029
Hours: 8:00AM-5:00PM
Pacific Time

Any return of a product or component to the factory must have a valid Return Material Authorization (R.M.A.) number printed on all shipping documents and on the shipping carton label. R.M.A.s are issued upon request by the division departments listed above.

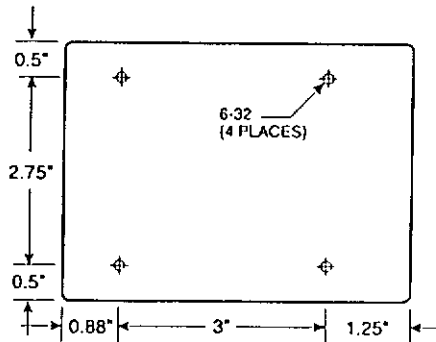
Dimensions

TOP VIEW



REAR VIEW

SIDE VIEW



BOTTOM VIEW