OBSOLETE DOCUMENT Technical Reference Only

Accessories

- **Smooth Start Valves available in 2 Basic Body sizes**
- **1/4" to 1-1/4" port sizes available**
- **Retards rate of downstream pressure buildup at start up**
- **Adjustable delay, up to 50 seconds**
- **Time delays available in two functional models for 0 to 5 and 0 to 60 second delays**
- **Time Delay on Operate and Time Delay on Release, normally open and normally closed available**
- **Can be used in conjunction with most Norgren Poppet valves**

Technical Data

Medium:
Smooth Start Valves: Filtered and lubricated compressed air or vacuum.
3-Port/2-Position Time Delays: Filtered, nonlubricated dry compressed air.
Other Time Delays: Filtered (5-micron), nonlubricated, dry compressed air at a constant pressure and temperature. The finer the filtration and the closer the regulation, the better the accuracy and repeatability of the time delay.

Mounting:
Through-holes in valve body, in-line, or on valve.

Port Size:
Smooth Start Valves: 1/4" – 1-1/4" BSPP, PTF, or ISO Rc.
3-Port/2-Position Time Delays: 1/4" BSPP, PTF, or ISO Rc.

Operating Pressure Range:
Smooth Start Valves: 2.1 to 20.7 bar (30 to 300 psig).
3-Port/2-Position Time Delays: 2.1 to 10.3 bar (30 to 150 psig).
Other Time Delays: Equal to or greater than main valve inlet pressure but not less than 2.1 bar (30 psig) and not greater than 10.3 bar (150 psig).

Operating Temperature:
Smooth Start Valves: -29° to 79°C (-20° to 75°F).
All Time Delays: 2° to 54°C (35° to 130°F).
Consult Technical Service for use below +2°C (35°F).

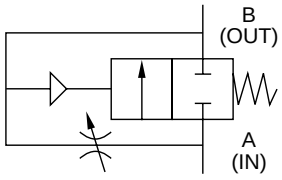
Materials:
Body: Aluminum alloy body, acetal, or aluminum check valve, stainless steel adjusting screw.
Elastomers: Nitrile rubber seals.

Ordering Information

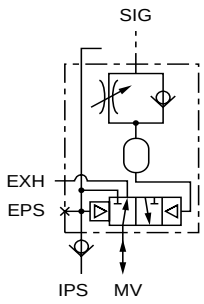
To order poppet valve accessories, quote model number from Tables overleaf, e.g. order

- A0015C for a 1/2" basic size, 1/2" port size Smooth Start 2-port, 2-position, spring return, normally closed valve.
- A104C-**04**- CE for a 2 port, 2-position spring return, normally closed Solenoid Pilot Operated valve fitted with a 0-60 second, normally closed Time Delay on Release (as indicated by the '**04**' in the model number).

Smooth Start Valve



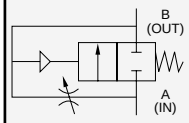
Time Delay Model 04



Examples of other models shown on following pages.

Smooth Start Valves

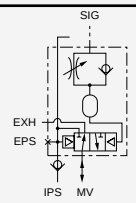
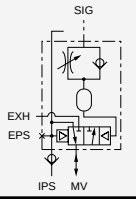
NORGREN Smooth Start Valves are 2-port/2-position, spring return, normally closed valves. They are used in compressed air systems to retard the rate of downstream pressure buildup at start up. Cylinders and other air operated devices are eased into positions corresponding to initial system pressurization, reducing the possibility of equipment damage and hazards to the user. Application of full downstream pressure can be delayed for as long as 50 seconds, depending on the setting of the adjustable needle valve and downstream air volume. *Smooth start valves never shut off completely and must be installed downstream of a directional control valve, such as a NORGREN Poppet Valve listed on the preceding pages.*

Symbol	Basic Size	Port Size	C_v Factor	Model	Weight kg (lbs.)	Spares Kit††	For Details see page
	1/2"	1/4"	2.1	A00*5A	0.57 (1.51)	53474-28	6
		3/8"	3.4	A00*5B	0.57 (1.51)	53474-28	6
		1/2"	5.3	A00*5C	0.57 (1.51)	53474-28	6
		3/4"	6.5	A00*5D	0.57 (1.51)	53474-28	6
	1"	3/4"	10.7	A00*5E	1.71 (3.78)	53475-26	6
		1"	13.5	A00*5F	1.71 (3.78)	53475-26	6
		1-1/4"	16.3	A00*5G	1.71 (3.78)	53475-26	6

* THREAD: Insert **4** for BSPP; **1** for PTF; or **6** for ISO Rc.

3-Port/2-Position Time Delay Valves

NORGREN Time Delay Valves consist of a 0 to 60 second time delay fitted with an A1 air operator and a special bottom cap with *IN* and *OUT* ports. They are used to provide delayed actuation or release of valves or other pneumatic devices that do not require large air flows.

Symbol	Type	Port Size	Cv Factor		Model	Weight kg (lbs)	For Details see page
			In to Out Ports	Out to Exhaust Ports			
	Normally Closed, Tim Delay on Operate (TDO)	1/4"	0.15	0.16	Z00*2A	0.94 (2.06)	7
	Normally Open, Time Delay on Operate (TDO)	1/4"	0.16	0.09	Z00*3A	0.94 (2.06)	

* THREAD: Insert **4** for BSPP; **1** for PTF; or **6** for ISO Rc.

0 to 5 Second Time Delays, & 0 to 60 Second Time Delays - Standard Applications and Special Applications
For Use With Air and Solenoid Operated Poppet Valves

Most NORGREN solenoid and air operated poppet valves can be equipped with an adjustable 0 to 5 or 0 to 60 second time delay. Both available in two functional models.

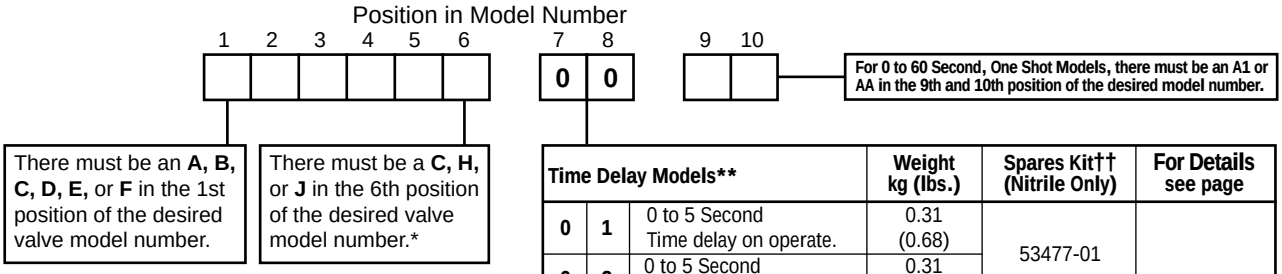
(1) *Time Delay on Operation* (TDO), which delays shifting of the main valve poppet on application of the pilot signal, and releases the poppet immediately upon removal of the signal, and

(2) *Time Delay on Release* (TDR), which shifts the main valve poppet immediately upon the application of the pilot signal, and delays release of the poppet on removal of the signal.

Norgren Air Pilot Operated Poppet Valves can be equipped with a Special Application 0 to 60 second One Shot Model, which shifts the main poppet respectively upon application of the pilot signal and releases the poppet after the time delay period is completed.

Ordering Information

- **USE ONLY WITH** valves as defined in the following diagram.
- To order valves with a time delay, note the desired valve model number from sections **5.4**.291 or **5.4**.292. Insert the desired time delay model number in the 7th and 8th positions of the valve model number as shown in the following diagram. For example: for a 4-Port/2-Position Air Pilot Operated In-line valve, F1024C-**00**-A1, with a 0 to 5 Second Time Delay on release order: F1024C-**02**-A1.
- **FOR 0 TO 5 SECOND TIME DELAY - DO NOT USE WITH** 2" basic valves.
- **FOR 0 TO 60 SECOND ONE SHOT SPECIAL APPLICATION - DO NOT USE WITH** 3-way twin valves.



Time Delay Models**			Weight kg (lbs.)	Spares Kit†† (Nitrile Only)	For Details see page
0	**1**	0 to 5 Second Time delay on operate.	0.31 (0.68)	53477-01	7
0	**2**	0 to 5 Second Time delay on release.	0.31 (0.68)		
0	**3**	0 to 60 Second Time delay on operate; Normally closed.	0.43 (0.95)	53477-03	
0	**4**	0 to 60 Second Time delay on release; Normally closed.	0.43 (0.95)		
2	**3**	0 to 60 Second One Shot Time delay; Normally open.	0.43 (0.95)		

NOTES:

***** Valves with an internal pilot supply are identified by a **C** in the 6th position of the model number. See Figure **1**(on following page) for installation. ALTERNATE CONFIGURATION - MODE - 23 ONE SHOT TIME DELAY: The Alternate Configuration of Model 23 Time Delay (see next page for description) requires an unrestricted internal pilot supply passage. Select the desired valve model number as described above, then change the 6th position of the model number to B, e.g. D1022**B**-23-A1, when ordering Model 23 Alternate Configuration. See figure 1 for installation. When used with valves that have an external pilot supply (designated by an **H** or **J** in the 6th position of the valve model number), the pilot supply must be connected to the operator (Figure 2). Zero to five second time delays do not have an external pilot supply port.

****** An adjustment screw provides an adjustment range of 0 to 5 or 0 to 60 seconds.
For 0 to 60 second ONLY this range can be extended by increasing the volume of the time delay cavity in the timer body. A port is provided in the body for connecting an additional external cavity which can consist of a short length of pipe (capped at one end) or other similar air receiver. Increasing the cavity an additional 29.5 cubic cm., (1.8 cubic inches) will roughly double the delay time for the same adjustment screw setting.

0 to 5 Second Time Delays, & 0 to 60 Second Time Delays - Standard Applications Cont.

Pilot Air Supply

The pilot air supply to the time delay must be filtered and regulated as described under *Medium*. For best timer performance, the installation shown in Figure 2 is recommended.

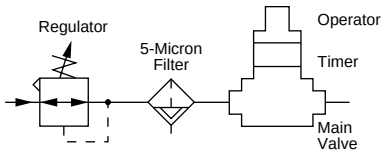
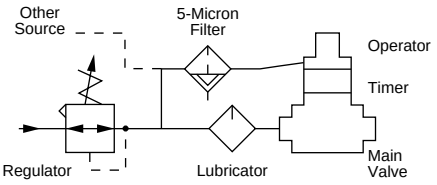


Figure 1. Internal Pilot Supply



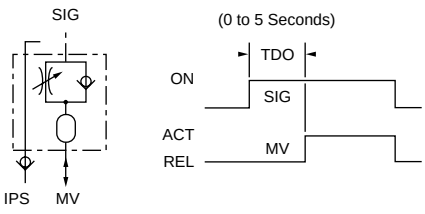
Connect the external pilot supply to the operator. The time delay will also be supplied from this connection.

Figure 2. External Pilot Supply

Graphic Symbols and Timing Sequences

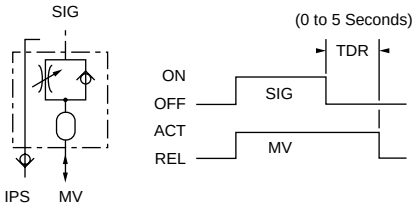
SIG — Pilot Signal
IPS — Internal Pilot Supply
EPS — External Pilot Supply (Shown Plugged)
EXH — Exhaust
MV — Main Valve (Piston)
ACT — Actuated
REL — Released (Deactuated)
IN PR — Inlet Pressure (Main Valve)
— Port/Passage Plugged
— Passage Blocked

Model 01 - Time Delay on Operate (TDO)



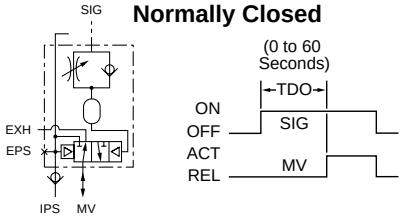
1. No pilot signal - main valve released.
2. Pilot signal applied - main valve actuates after the time delay period (TDO) is completed and remains actuated so long as the pilot signal is sustained.
3. Pilot signal removed - main valve released immediately.

Model 02 - Time Delay on Release (TDR)



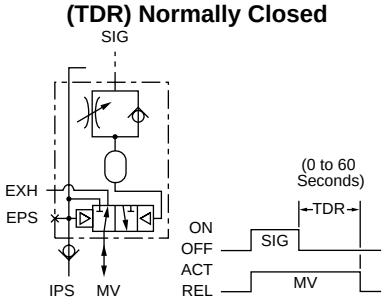
1. No pilot signal - main valve released.
2. Pilot signal applied - main valve actuates immediately and remains actuated so long as the pilot signal is sustained.
3. Pilot signal removed - main valve releases after the time delay period (TDR) is completed.

Model 03 - Time Delay on Operate (TDO) Normally Closed



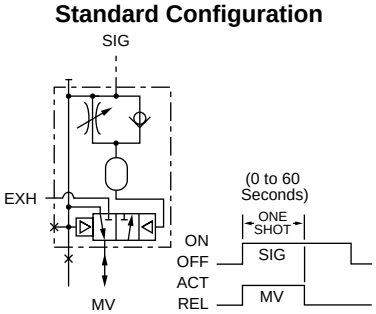
1. No pilot signal - main valve released.
2. Pilot signal applied - main valve actuates after the time delay period (TDO) is completed and remains actuated so long as the pilot signal is sustained.
3. Pilot signal removed - main valve released immediately.

Model 04 - Time Delay on Release (TDR) Normally Closed



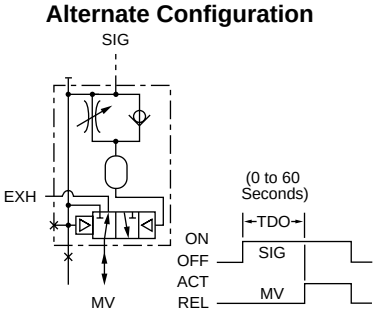
1. No pilot signal - main valve released.
2. Pilot signal applied - main valve actuates immediately and remains actuated so long as the pilot signal is sustained.
3. Pilot signal removed - main valve releases after the time delay period (TDR) is completed.

Model 23 One Shot, Normally Open Standard Configuration



1. No pilot signal - main valve released.
2. Pilot signal applied - main valve actuates immediately, then releases after the time delay period (one shot) is completed and remains released.
3. Pilot signal removed - main valve remains released.

Model 23 One Shot, Normally Open Alternate Configuration



1. Main valve inlet pressurized - main valve actuates immediately, then releases after the time delay period (one shot) is completed and remains released.
2. Main valve inlet pressure reduced to zero psig - main valve remains released.

Internal pilot supply Shut off air supply to main valve. Cycle valve operator until trapped air is exhausted from the main valve piston chamber, operator, and time delay. You may also install a 2-way vent valve on the external pilot supply port.

External pilot supply Shut off air supply to main valve and the pilot supply. Cycle the valve operator until the trapped air is exhausted. You may also install a 2-way vent valve on external pilot supply line.

WARRANTY

All items sold by NORGREN Valves are warranted tobe free from defects in materials and workmanship for a period of two years from the date of manufacture, provided said items are used according to NORGREN's recommended usages. NORGREN's liability is limited to the repair of, refund of purchase price paid for, or replacement in kind of, at NORGREN's sole option, any items proved defective, provided the allegedly defective items are returned to NORGREN prepaid. The warranties expressed above are in lieu of and exclusive of all other warranties. There are no other warranties, expressed or implied, except as stated herein.

There are no implied warranties of merchantability or fitness for a particular purpose, which are specifically disclaimed. NORGREN's liability for breach of warranty as herein stated is the exclusive remedy, and in no event shall NORGREN be liable or responsible for incidental or consequential damages, even if the possibility of such incidental or consequential damages has been made known to NORGREN.

NORGREN reserves the right to discontinue manufacture of any product or change product materials, design, or specifications.

WARNING

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under 'Technical Data'.

Before using these products with fluids other than those specified, for non-industrial applications, life support systems, or other applications not within published specifications, consult Norgren.

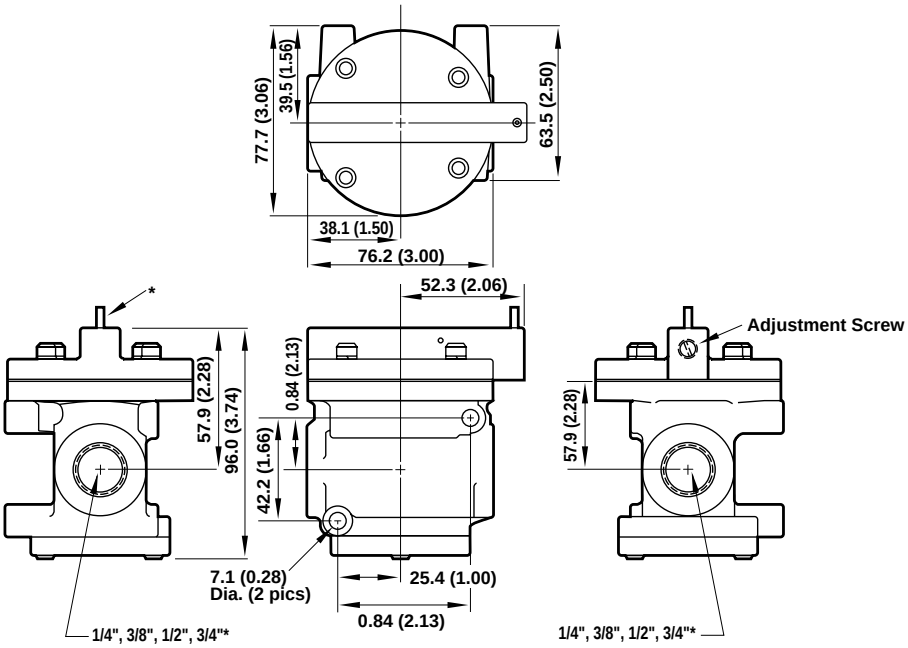
Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts
used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
Systems designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products where applicable.

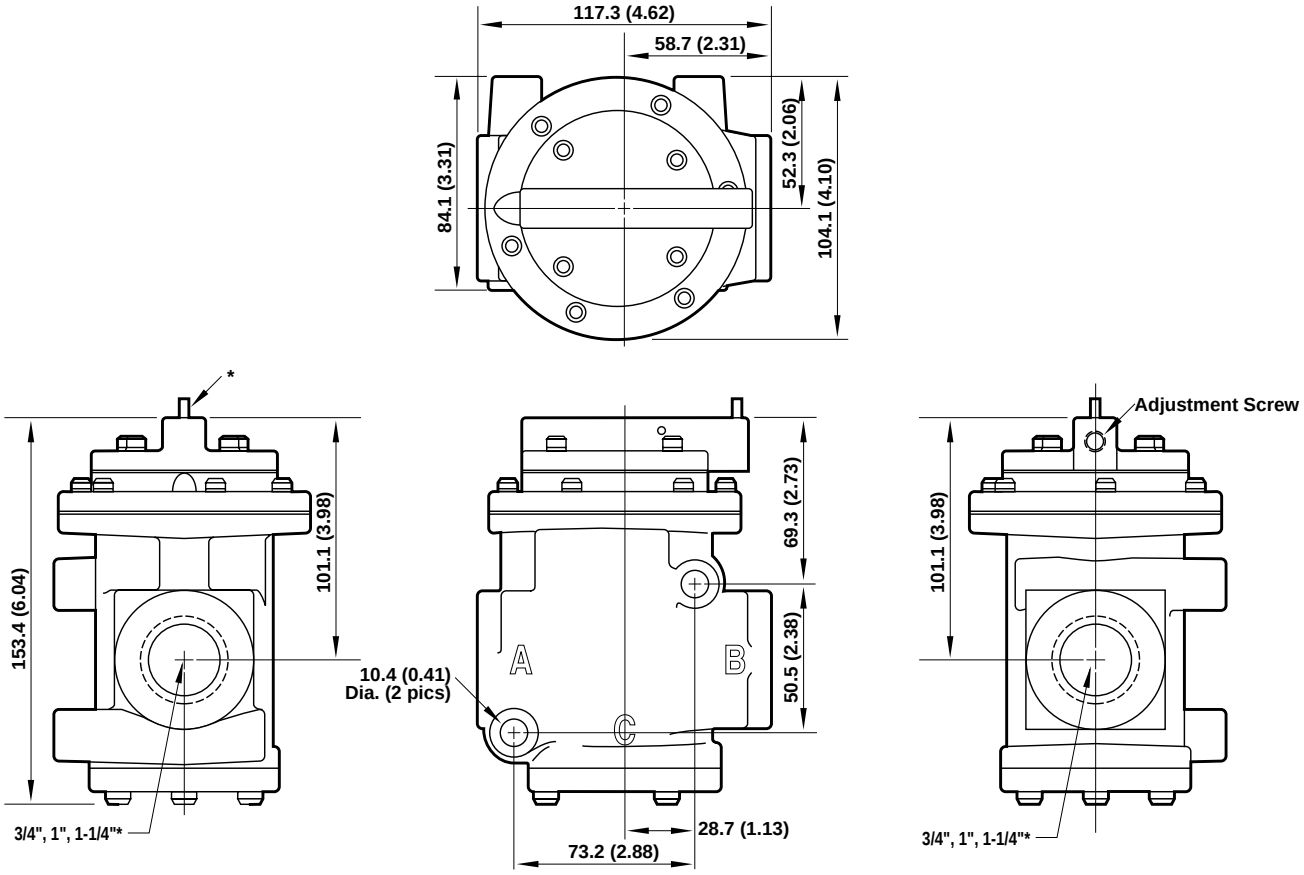
Smooth Start Valves Dimensions

Dimensions in mm (inches).

Basic 1/2-Inch A00*5A, A00*5B, A00*5C & A00*5D.



Basic 1-Inch A00*5E, A00*5F & A00*5G.

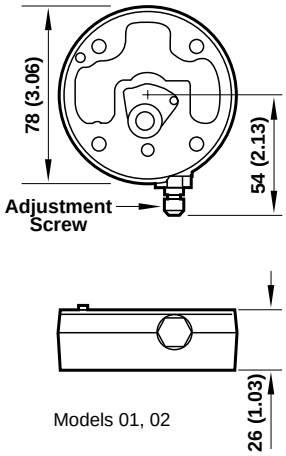


* After final adjustment, drive pin in until flush to make adjustment tamper resistant.

Time Delay Valve Dimensions

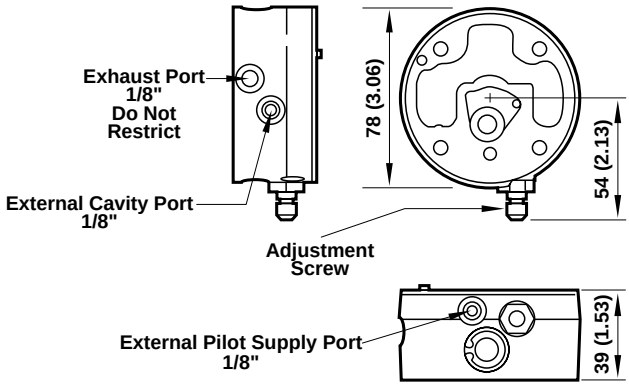
Dimension in mm (inches).

0 to 5 Second Time Delays



Models 01, 02

0 to 60 Second Time Delays



Models 03, 04, 23

3-Port/2-Position Time Delays