

Bermad Electro-Pneumatically Controlled On-Off Deluge Valve

Model: 400E-6D

INSTALLATION
OPERATION
MAINTENANCE



Safety First

BERMAD believes that the safety of personnel working with and around our equipment is the most important consideration. Please read all safety information below and from any other relevant source before attempting to perform any maintenance function.

Comply with all approved and established precautions for working with your type of equipment and/or environment.

Authorized personnel should perform all maintenance tasks.

Prior to performing a procedure, read it through to the end and understand it. If anything is not clear, ask the appropriate authority.

When performing a procedure, follow the steps in succession without omission.

1. Description

BERMAD 400E-6D Electro-Pneumatically Controlled Deluge operates by an electric Solenoid Valve (24b fig.1), which actuates a Normally Held Closed PORV (6B fig.1) and requires a listed System Control Panel with a compatible electric detection system.

The specific-trim for Deluge Valve 6D includes a PORV (6B fig.1), normally held closed by pressure maintained in the pneumatic supply system and closed Manual Emergency Release (15B fig.1).

In Fire condition, either in response to opening the pneumatic release, or when detection system causes the System Control Panel to be activated, the Solenoid Valve is activated, this in turn opens the PORV releasing water pressure from the control-chamber causing the Bermad Deluge Valve to open, and thereby allowing water to enter the system piping. Water will flow from any open sprinklers and/or spray nozzles on the system.

Deluge systems are commonly used where, when the system operates, it is desirable to simultaneously spray water from all open sprinklers and/or nozzles on the system.

Note

A regulated supply of pressurized gas (air or nitrogen) is required. See section "Reset the system" below concerning air supplies for release system.

2. UL Listed

BERMAD 400E-6D Deluge Valve is UL Listed when installed with specific components & accessories. Refer to the current UL Directory. Consult the manufacturer for any component approval recently to appear in the UL fire protection equipment directory.

3. Installation

Subject to all other instructions, drawings and technical specifications which describe Bermad 400E-6D Deluge Valve, install in their proper positions the components comprising the Deluge Trim Package, according to the drawing relevant to the specific type, hereby enclosed.

Install also the additional accessories, which appear in the drawing and which must be installed as shown in the drawing, although they are not packed together with the Bermad Deluge Valve itself.

Any deviation in trim size or arrangement may adversely affect the proper operation of the Deluge Valve.

Refer also to NFPA 13 or the applicable installation standards, codes and relevant authorities.

- 4.1. Allow enough room around the valve assembly for any adjustments and future maintenance/disassembly work.

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- 4.2. Before the valve is installed, flush the pipeline to remove any dirt, scale, debris, etc. Failure to do this might render the valve inoperable.
- 4.3. Listed indicating valves should be installed upstream and downstream of the BERMAD 400E-6D Deluge Valve in such a way to allow for future maintenance.
- 4.4. Install the valve in the pipeline with the valve flow arrow on the body casting in the proper direction. Use the lifting eye provided on the main valve cover for lifting and lowering the valve.
- 4.5. BERMAD 400E-6D Deluge Valve is intended for horizontal or vertical installation. Ensure that the valve is positioned so that the actuator can be easily removed for future maintenance.
- 4.6. Install also the additional accessories, which appear in the drawing and which must be installed as shown in the schematic drawing.
- 4.7. When using a Pressure control switch, connect the Pressure Control Switch to the Electric Control System and the Control Panel according to the supplied Electrical Wiring Diagram
- 4.8. After installation, carefully inspect/correct any damaged accessories, piping, tubing, or fittings.
- 4.9. Any deviation in trim size or arrangement, which is not performed by a representative of BERMAD, may adversely affect the proper operation of the Deluge Valve. Refer also to NFPA 13 or the applicable installation standards, codes or relevant authorities.
- 4.10. The Deluge Valve and trim must be installed only in areas where they will not be subjected to freezing temperatures.
- 4.11. Install a pneumatic pressure supply system; see "Pneumatic System Pressure Requirements" below.
- 4.12. Pneumatic System Pressure Requirements:

A regulated supply of pressurized air or nitrogen is required to maintain a pneumatic pressure supply system, See "Placing in Service" section below prior to connecting the air supply to the system.

The Pneumatic system shall use a clean, dependable and continuous (24 hours a day, 7 days a week) compressed-air source using an independent air compressor or an Air Maintenance Device supplied by an dry nitrogen-gas supply or external high Air pressure source.

NOTE: Any event of an air supply failure, slow leakage of air from the pneumatic system, will result in activation of the PORV, causing the Deluge Valve to open. Water will then flow from any open sprinklers and/or spray nozzles on the system and the Alarm will operate.
- 4.13. Electrical & Solenoid Requirements:

The Solenoid Valve shall be wired to the Releasing Control Panel according to information provided by the control panel manufacturer.

Standard Solenoid data (others are optional):

 - Voltage: 24VDC
 - Normally Position: NO (for Closed Main Deluge Valve when De-Energized)
 - Enclosure Type: 1,2,3,3S, 4 and 4X/IP-65 (For Hazardous Locations enclosure, see catalog)
 - Electrical Rating: 8 Watt / F (0.44 Amp) or less

NOTES:

Any deviation in trim size or arrangement may adversely affect the proper operation of the Deluge Valve.

All initiating devices (detectors), indicating appliances, releasing devices, pilot line actuation devices (such as thermostatic releases, and/or fixed temperature releases), as well as the system control panel, must be compatible and UL listed for use with the particular Deluge System. Refer to current "UL Listed Fire Protection Equipment Directory". Refer also to NFPA 13 or the applicable installation standards, codes and authorities having jurisdiction.

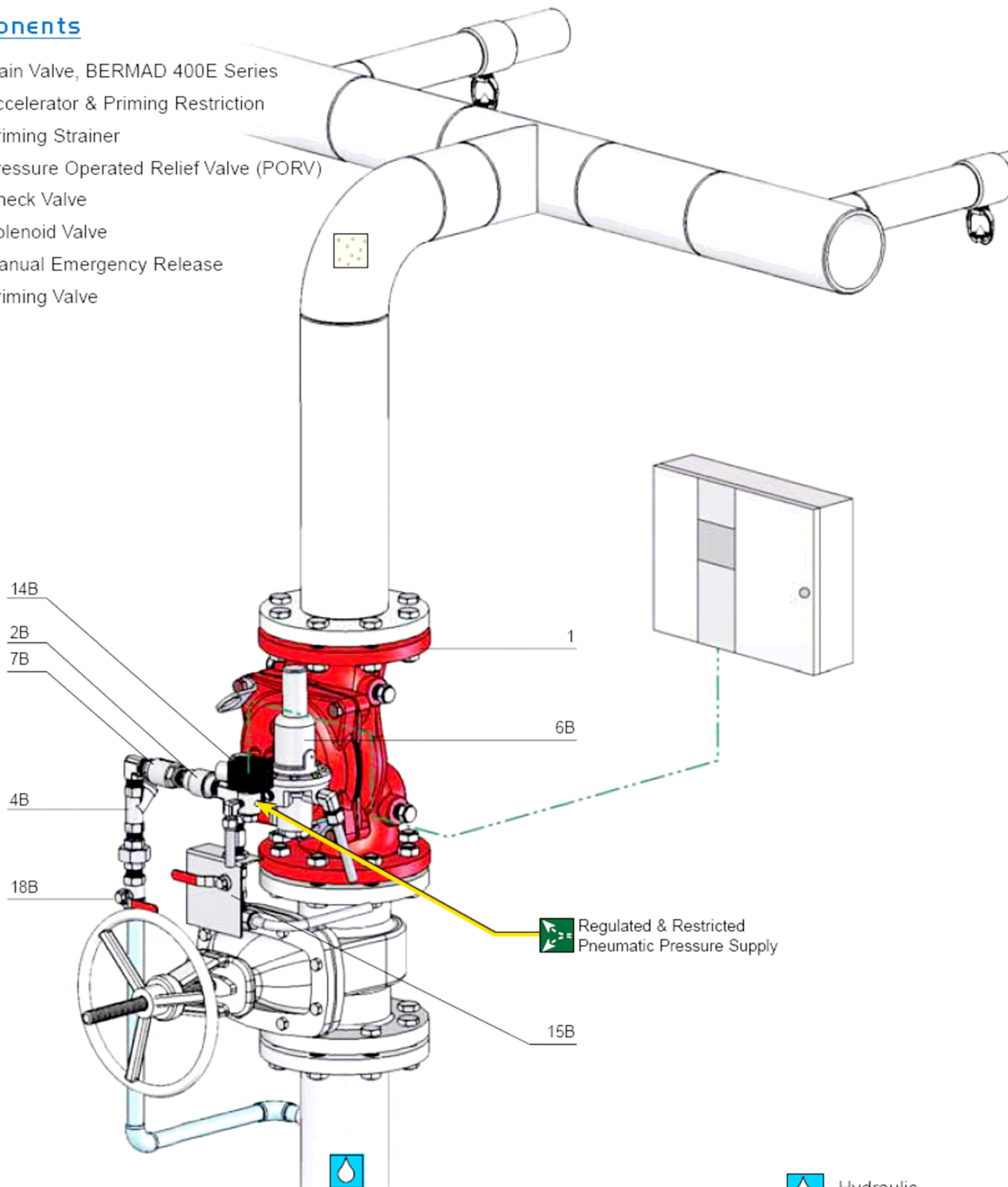
WARNING: The Deluge Valve and trim must be installed only in areas where they will not be subjected to freezing temperatures.

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Figure 1: Installation Drawing

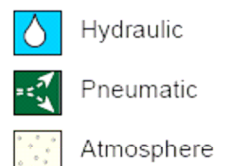
Components

- 1 - Main Valve, BERMAD 400E Series
- 2B - Accelerator & Priming Restriction
- 4B - Priming Strainer
- 6B - Pressure Operated Relief Valve (PORV)
- 7B - Check Valve
- 14B - Solenoid Valve
- 15B - Manual Emergency Release
- 18B - Priming Valve



Note

The BERMAD Model 400E-6D is UL Listed. The installation shall include Indicating and Drain Components.



4. Equivalent Length

Deluge Valve Equivalent Length Value (Steel Pipe), for use in hydraulically calculated systems

Valve Size	Equivalent Length Value Meter (Ft)
2"	9.1 (30) of 2" pipe
2½"	12.1 (40) of 2½" pipe
3"	13.7 (45) of 3" pipe
4"	14 (46) of 4" pipe
6"	27.4 (90) of 6" pipe
8"	45.7 (150) of 8" pipe

5. Optional Equipment

If required, order a pressure switch to either activate an electric alarm, or shut down desired equipment.

6. Placing in Service/Resetting the System

- 7.1. Place the detector circuit in service.
- 7.2. Reset the Solenoid Valve (24B fig.1) by resetting the releasing control panel
- 7.3. Operate pneumatic pressure supply system, allowing release system pressure to build up to a range of 20 to 30 psi (1.4 to 2.0 barg). Check the entire system for leaks
- 7.4. Check the entire Dry Pilot release system for leaks. Replace any fused plugs temperature-releases.

NOTE: Any automatic air or nitrogen pressure supply must feed the system through an orifice restriction. If a low air pressure alarm is utilized, test it by dropping the release line pressure. Restore pressure after the test.

- 7.5. Close all emergency release valves.
- 7.6. Test supervisory circuits in releasing control panel.
- 7.7. Open the priming-line valve (18B fig.1). Check that there is no water flow from the PORV (6B fig.1).
Allow pressurized water to fill the top chamber of the Deluge Valve.
- 7.8. When the control chamber pressure gauge indicates full upstream pressure and is no longer rising, the release system is reset.
- 7.9. Slowly Open the supply Isolating Valve and check that no water flows into the system.
- 7.10. Depress the Drip Check and drain any water from the system side of the Deluge Valve.

The system is now operational and in a standby mode.

7. Removing the System from Service

When taking the Deluge System out of service, a fire patrol should be established in the system area. If automatic fire-alarm signaling equipment is utilized, the proper authority should be notified that the

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system is being removed from service. The insuring body and owner representative should also be notified when the system is being taken out of service.

Removing Instructions

- 8.1 Shut off the main supply-isolating valve.
- 8.1 Close the Priming line valve (18B fig.1) to Deluge Valve Control chamber.
- 8.2 Open all drain valves.
- 8.3 Release the water pressure from the control chamber of the Deluge Valve by pulling the Manual emergency release (15B fig.1).
- 8.4 If auxiliary power is used, disconnect the power supply and batteries.
- 8.5 Place "Fire Protection System Out of Service" signs in the area protected by the system.

8. Operation

Bermad Deluge Valve prevents water from entering system piping until required. The Deluge Valve is kept closed by pressure applied to the top chamber through a restricted priming line.

In the SET position the water pressure supplied through the priming line is trapped in the top chamber of the Deluge Valve by the check valve (7B fig.1) and the Normally Held Closed PORV (6B fig.1)

The PORV is held closed by regulated external actuating pressure maintained in the pneumatic or hydraulic supply system by the Normally Closed solenoid valve (24B fig.1) and another check valve.

The pressure trapped in the top chamber of the Deluge Valve presses the valve seal disc down, sealing the valve and keeping the system piping dry.

In FIRE conditions, when the pressure is released from the top chamber, by the PORV in combination with the energized Solenoid Valve or by manual release, faster than it is supplied through the restricted priming line, the Deluge Valve opens and allows the inlet supply water to flow through the valve into the system and alarm devices.

WARNING: Whenever the handle of the Manual Emergency Release (15B fig.1) is pulled, pressure is released from the top chamber, the Deluge Valve will open, and water will flow into system piping and alarm devices.

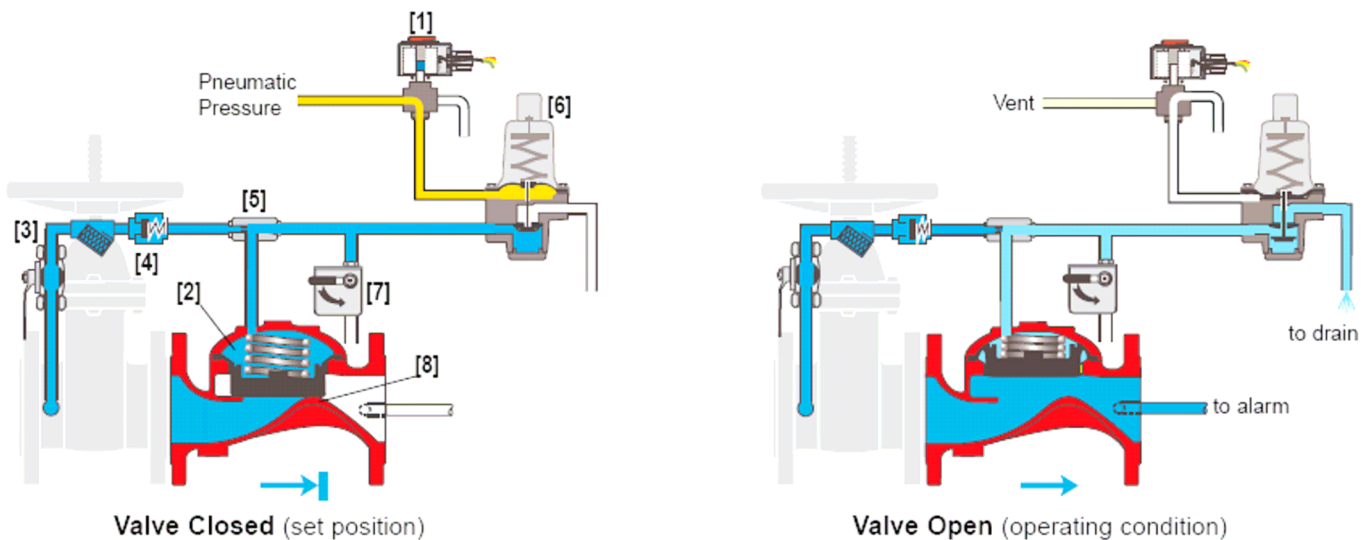
Air Supply Troubles:

Any event of an air supply failure, slow leakage of air from the pneumatic release system, and/or failure to restore air supply to the pneumatic release system, will result in activation of the Pneumatic PORV, causing the Deluge Valve to open. Similarly, if the release system is activated due to mechanical damage or malfunction, the Deluge Valve will open and water to flow into the system piping and to the alarm device.

9. Manual Operation

Whenever the handle of the Manual Emergency Release Valve (15B fig.1) is pulled, pressure is released from the top chamber, the Deluge Valve will open, and water will flow into system piping and alarm devices.

Figure 2: Operation Drawing



10. Maintenance and Inspection Test

WARNING: Do not turn off the water supply to make repairs without placing a roving fire patrol in the area covered by the system. The patrol should continue until the system is back in service.

- 11.1 Prior to turning off any valves or activating any alarms, notify local security guards and the central alarm station, if used, so that a false alarm will not be signaled.
- 11.2 In any of the following inspections or testing procedures, if an abnormal condition exists, see Abnormal Conditions for possible cause and corrective action.
- 11.3 See NFPA Pamphlet No. 25 and also relevant publications by authorities having jurisdiction. Weekly Inspection.
- 11.4 The system should be checked for Set Condition. See above "Set Condition (Normal condition)".
- 11.5 Observe the upstream pressure gauge: it should indicate that the normal supply of water pressure to the Deluge Valve is maintained.

11. Normal Conditions

Ensure that the following Set Conditions are met.

Item	Status
All Main Isolating Valves	OPEN and sealed with tamperproof seals
All Manual Releases	CLOSE position and sealed
Alarm Shut-Off Valve (11A)	OPEN position
Priming Ball Valve (18B)	OPEN
Control-Chamber Gauge (if installed)	OPEN gauge valve, the Pressure Gauge indicates rate of pressure in Control-Chamber
Upstream Pressure Gauge (if installed)	OPEN gauge valve, the Pressure Gauge indicates the upstream supply pressure to the Deluge Valve
Control Panel & Detections	Are in service and its stand-by position.
Pneumatic Release System	20 to 30 psi (1.4 to 2.0 bar) is maintained, pressure supply system is ON and functioning properly
Releasing Devices	CLOSED with no leaking

12. Weekly Inspection

- 12.1 The system should be checked for Set Condition. See above "Set Condition (Normal condition)".
- 12.2 Observe the upstream pressure gauge, it should indicate that the normal supply of water pressure to the Deluge Valve is maintained.

13. Monthly Inspection and Test

- 13.1 Complete Weekly Inspection.
- 13.2 Test the water-motor alarm and/or electric alarm (if installed), by turning the alarm test valve to the open position. The alarm should sound. Turn to close position
- 13.3 Inspect the electric detection system and electric release control panel, as suggested by the release control panel manufacturer
- 13.4 Inspect the Pneumatic release system (if utilized), Drain condensation from release-lines and service the dehydrator if necessary.

14. Annual Inspection and Test

- 14.1 Complete Weekly, Monthly and Semi-Annual inspections
- 14.2 Place the system out of service (See "Removing The System From Service" above).
- 15.1 Trip the release-line system, clean all strainers (4B fig.1), and priming-line restriction (2B fig.1).
- 15.2 The interior of the Deluge Valve should be cleaned and inspected.
- 15.3 The interior of the PORV (6B fig.1), including its diaphragm and seal, should be inspected and cleaned.
- 15.4 Place the system back in service. (See instructions "Placing the System in Service").
- 15.5 The Deluge Valve, trim, auxiliary devices and manual release must be activated at full flow.
- 15.6 Note: The system will be flooded! Take all necessary precautions to drain water and prevent damage in the area protected by the Deluge system.

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- 15.7 Trip-test the deluge system with an electric release control panel. The release may be tripped by the method suggested by the release control panel manufacturer
- 15.8 Trip test the deluge system by decreasing pressure in the pneumatic release system.
- 15.9 The manual emergency release handle (15B fig.1) is to be pulled. The Deluge Valve should open and discharge water. Observe upstream Pressure Gauge while full flow is on. Inspect all system nozzles.
- 15.10 Take all additional measures as required by NFPA-25 "Standard for the Inspection Testing and Maintenance of Water-Based Fire Protection Systems."
- 15.11 Clean the priming strainer (4B fig.1) prior to resetting the Deluge Valve

15. Abnormal Conditions

16.1 Alarm Pressure Switch Fails to Sound

- A. Check for obstructions in the alarm test line.
- B. Clean the alarm-line strainer (if a water motor alarm is installed).
- C. Make certain the alarm is free to operate.
- D. Test the electrical circuit to the electric alarm (if utilized)

16.2 False Trip

Check for any of the following possible causes:

- A. Check and test the electrical circuit to the Solenoid Valve (14B fig.1).
- B. Check for Malfunctioning Air release system.
- C. PORV (6B fig.1) out of order.

16.3 Leakage through Deluge Valve

Check for any of the following possible causes:

- A. Check for clogged priming strainer (4B fig.1) or plugged priming restriction (2B fig.1).
- B. Inadequate Pneumatic Pressure supply on relies system (pneumatic).
- C. Leaking control trim.
- D. Leaking Dry Pilot release system.
- E. Damaged deluge valve internal Elastomers or seat.
- F. PORV (6B fig.1) out of order.

16.4 Deluge Valve Will Not Reset

Check for any of the following possible causes:

- A. An open main control valve.
- B. Release system not properly drained.
- C. Inadequate Pneumatic Pressure supply.
- D. Check for clogged priming strainer (4B fig.1), the screen should be properly cleaned.
- E. Closed priming valve (18B fig.1).
- F. Check for Foreign object lodged between seal and valve seat.
- G. Control Panel is not reset. Check for Faulty circuits, using manufacturer instructions.
- H. Leak in Dry Pilot Line release system.

16.5 Electric Release System Will Not Reset

- A. Faulty Detector Circuit
- B. Faulty circuit to the Solenoid Valve (14B fig.1) or Release Control Panel.
- C. Observe if the Pressure Switch Cock Valve is open.

16.6 Difficulty in Performance

Where difficulty in performance is experienced, BERMAD or its authorized representative should be contacted if any field adjustment is to be made.