

PHILIPS COLDHEAD SERVICE KIT User Manual

COMPLETE SERVICE KIT FOR PHILIPS MRI
COLDHEAD MAINTENANCE



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TABLE OF CONTENTS

Chapter	Page
1. Introduction	4
2. Kit Contents and Component Identification	5
3. Safety & Kit Preparation	8
4. Operating Instructions	9
5. Storage and Maintenance	14

1.INTRODUCTION

1.1 Purpose of the Manual:

1.1.1 This manual provides instructions for the identification, preparation, connection, operation, storage, and basic maintenance of the ECHO Philips Coldhead Service Kit.

1.1.2 It describes the general purpose of each component supplied with the kit and provides detailed operating instructions for the Heater Controller.

1.1.3 This manual is intended for trained MR field service engineers and magnet technicians performing coldhead service operations on compatible Philips MRI magnet systems.

1.2 Product Overview:

1.2.1 Designed and manufactured by ECHO Magnet Services B.V., the Philips Coldhead Service Kit combines the Heater Controller, dedicated connection cables, mechanical service tools, and helium-handling equipment required to support coldhead service operations.

1.2.2 The Heater Controller connects to the magnet using the dedicated Standard or Alternate Heater Cable. It allows the user to monitor the 20K and 80K temperatures, set the requested temperature, and operate the heaters during preparation for coldhead service.

1.2.3 The remaining components provide the mechanical, connection, purge, charge, inspection, and handling functions required during the applicable coldhead service procedure.

1.3 Intended Use and Scope:

1.3.1 The ECHO Philips Coldhead Service Kit is intended to support coldhead service operations on compatible Philips MRI magnet systems.

1.3.2 This manual provides the complete operating instructions for the ECHO Heater Controller. The remaining kit components are identified together with their general purpose.

1.3.3 Coldhead removal, servicing, installation, helium purge, charging, and system restoration shall be performed in accordance with the applicable OEM service documentation for the magnet and coldhead configuration being serviced.

2. KIT CONTENTS AND COMPONENT IDENTIFICATION

2.1 Kit Contents

2.1.1 The ECHO Philips Coldhead Service Kit contains the components listed in the following table. Before use, verify that all required components are present and free from visible damage.

Item	Description	Qty.	Part Number	Purpose
1	Flight Case	1	136580	Protects and organizes the kit during transport and storage.
2	Heater Controller	1	EMS1962	Monitors the 20K and 80K temperatures and controls the heaters during coldhead service preparation.
3	AC power cable	1	10.01.15	Connects the Heater Controller to the applicable AC power supply.
4	Standard Heater Cable #item 4	1	10.01.25	Connects the Heater Controller to a magnet with the Standard connector configuration.
5	Alternate Heater Cable #item38	1	10.01.26	Connects the Heater Controller to a magnet with the Alternate connector configuration.
6	Debris cover coldhead sleeve	1	900032	Protects the open coldhead area against dust, debris, and contamination.
7	Pin Punch	1	900038	Assists with the controlled removal or installation of applicable pins and stems.
8	8mm PVC pipe	1	10.01.27	Provides a flexible gas path for applicable helium purge and service connections.
9	Hi pressure pipe	1	10.01.28	Transfers pressurized helium to the applicable coldhead service connection.
10	HP to 8mm converter	1	10.01.29	Adapts the high-pressure connection to the 8 mm service line.
11	Helium purge wand	1	10.01.33	Directs helium flow during applicable purge and cleaning operations.

12	Compressor re-charge adapter F40/F50/F70	1	10.01.34	Provides the service connection for recharging compatible F40, F50, and F70 compressors.
13	Jacking posts long	3	900026	Provide mechanical support during applicable coldhead removal or installation procedures.
14	Jacking posts short	3	900027	Provide mechanical support where the short jacking configuration is required.
15	Jacking screws thin	3	900028	Provide controlled movement with the applicable jacking-post configuration.
16	Jacking screws thick	3	900029	Provide controlled movement with the applicable jacking-post configuration.
17	5mm None-Magnetic T-allen key	1	900030	Operates applicable 5 mm hex fasteners within the magnet service area.
18	Piston Puller	1	900031	Assists with controlled removal and installation of the coldhead displacer assembly.
19	Line wrench 26/32mm	1	900033	Holds and turns applicable gas-line fittings during connection and disconnection.
20	Line wrench 30/38mm	1	900034	Holds and turns applicable larger gas-line fittings during connection and disconnection.
21	1st Stage seating tool	1	900035	Assists with correct seating of applicable first-stage seals and components.
22	Coldhead Charge/Purge adapters	1	10.01.35	Provide service connections for coldhead charge, purge, and vent operations.
23	Inner slack piston seating tool	1	900039	Assists with correct seating of the applicable inner slack piston seals.
24	2nd stage seating tool	1	900040	Assists with correct seating of applicable second-stage seals and components.
25	Valve stem alignment tool	1	900037	Assists with correct alignment of the coldhead valve stem during service.
26	Variable Bonnet / Orifice wrench	1	900036	Operates the applicable variable bonnet or orifice during coldhead service.

27	Flex line purge adapter	1	10.01.32	Connects the applicable flexible gas line to the purge connection.
28	Helium gas regulator 30Bar	1	25GX-500-580	Regulates helium-cylinder outlet pressure for the applicable service procedure.
29	Spare fuse kit	1	10.01.31	Contains replacement fuses for the Heater Controller.
30	Copper pipe	1	10.01.30	Provides a rigid gas path for applicable helium service connections.
31	Snoop leak detector liquid	1	MS-SNOOP-20Z	Checks gas-line fittings and couplings for leakage after connection.
32	Feeler gauge set	1	45060349	Measures applicable mechanical clearances during coldhead service.

Table 2-1: ECHO Philips Coldhead Service Kit Content list and purposes

2.2 Component Usage:

2.2.1 The descriptions in Table 2-1 identify the general purpose of each component. They do not define the complete coldhead service procedure.

2.2.2 Use the supplied service components in accordance with the applicable OEM service documentation for the magnet and coldhead configuration being serviced.

2.2.3 Detailed connection and operating instructions for the Heater Controller are provided in Chapter 4.

3. SAFETY & KIT PREPARATION

3.1 Qualified Personnel:

3.1.1 The ECHO Philips Coldhead Service Kit shall be used only by trained MR field service engineers and magnet technicians familiar with coldhead service operations..

3.1.2 Before starting the service, review the applicable Philips OEM service documentation for the magnet and coldhead configuration being serviced.

3.1.3 Do not perform a coldhead service operation unless the required tools, helium equipment, replacement parts, and applicable OEM instructions are available..

3.2 Magnetic Field Safety:

3.2.1 **CAUTION:** The kit is used close to an MRI magnet where a strong magnetic field may be present.

3.2.2 Do not assume that all components supplied with the kit are non-magnetic. Keep the Heater Controller, tools, cables, adapters, and other components under control at all times within the magnet area.

3.2.3 Never leave kit components unsecured on or near the magnet. A component attracted by the magnetic field may cause personal injury or damage to the magnet and surrounding equipment.

3.2.4 Use the supplied non-magnetic tool where specified by the applicable OEM service procedure.

3.3 Pressurized Helium Safety:

3.3.1 **WARNING:** The coldhead, compressor gas lines, helium cylinder, hoses, and service connections may contain pressurized helium.

3.3.2 Do not disconnect or loosen a pressurized gas-line connection. Depressurization, purge, charge, and vent operations shall be performed according to the applicable Philips OEM service procedure.

3.3.3 Use only the appropriate regulator, pipes, hoses, adapters, and fittings for the required service connection. Do not use components that are damaged, contaminated, or incompatible with the system.

3.3.4 When loosening or tightening gas-line connections, use the specified service tools and support the mating fitting as required by the applicable OEM procedure.

3.4 Kit Preparation:

Before starting the service:

- Verify that the required kit components are present.
- Inspect the Heater Controller, cables, tools, hoses, adapters, and fittings for visible damage or contamination.
- Identify the Standard or Alternate connector configuration on the magnet.
- Select the corresponding dedicated Heater Cable.
- Confirm that the applicable OEM service documentation is available.
- Keep unused components secured in the Flight Case until required.

4. OPERATING INSTRUCTIONS

4.1 Heater Controller Overview:

4.1.1 During operation of the ECHO Philips Coldhead Service Kit, the Heater Controller is connected to the magnet using the dedicated Standard or Alternate Heater Cable.

4.1.2 The Heater Controller monitors the 20K and 80K temperatures and operates the corresponding heaters to prepare the magnet for coldhead service.

4.1.3 The requested temperature is set from the touchscreen. Both temperature channels shall be monitored throughout the heating and stabilization process.



Illustration 4-1: Heater Controller Front Panel



Illustration 4-2: Heater Controller Rear Panel

4.2 Connection to the Magnet

4.2.1 Locate the 11-pin connector on the Philips magnet turret.



Illustration 4-3: 11-pin Deutsch connector port on Philips Magnet Turret

4.2.2 Identify whether the magnet is equipped with the Standard or Alternate connector configuration.

4.2.3 Select the dedicated Heater Cable corresponding to the connector configuration. Use the Standard Heater Cable for the Standard configuration and the Alternate Heater Cable for the Alternate configuration.

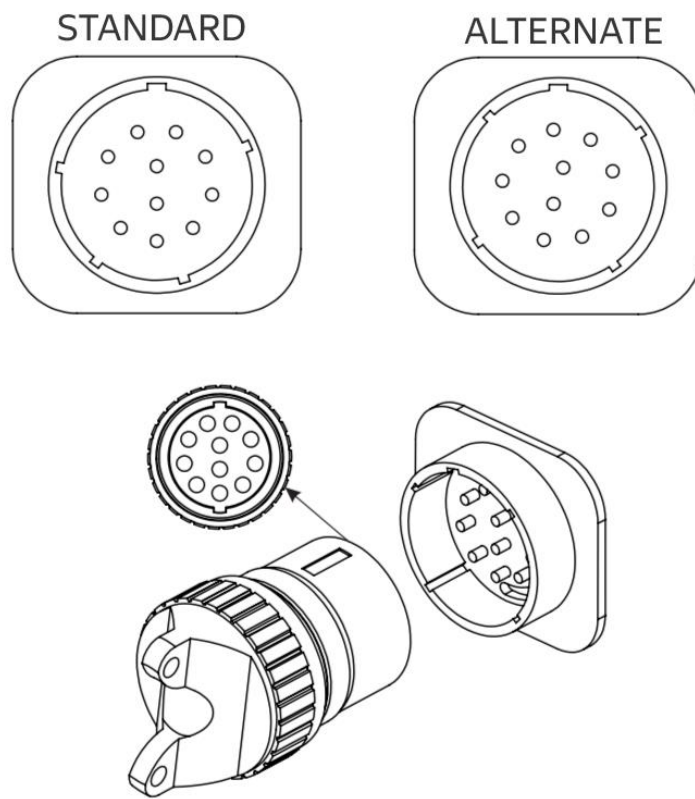


Illustration 4-4: Standard and Alternate Magnet Connector

4.2.4 Align the selected Heater Cable with the magnet connector and connect it securely. Do not force an incorrectly aligned connector into position.

4.2.5 Connect the other end of the dedicated Heater Cable to the corresponding connector on the rear of the Heater Controller.

4.2.6 Connect the AC power cable to the Heater Controller.

4.3 Heater Controller Operation:

4.3.1 Verify that the Heater Controller is correctly connected to the magnet using the dedicated Heater Cable.

4.3.2 Fully open the yellow valve.

4.3.3 Turn ON the Heater Controller power.

CAUTION: Do not switch on the heater controller before the yellow ball valve is open.

4.3.4 Set the requested temperature on the touchscreen.

4.3.5 Turn ON the heaters from the touchscreen.

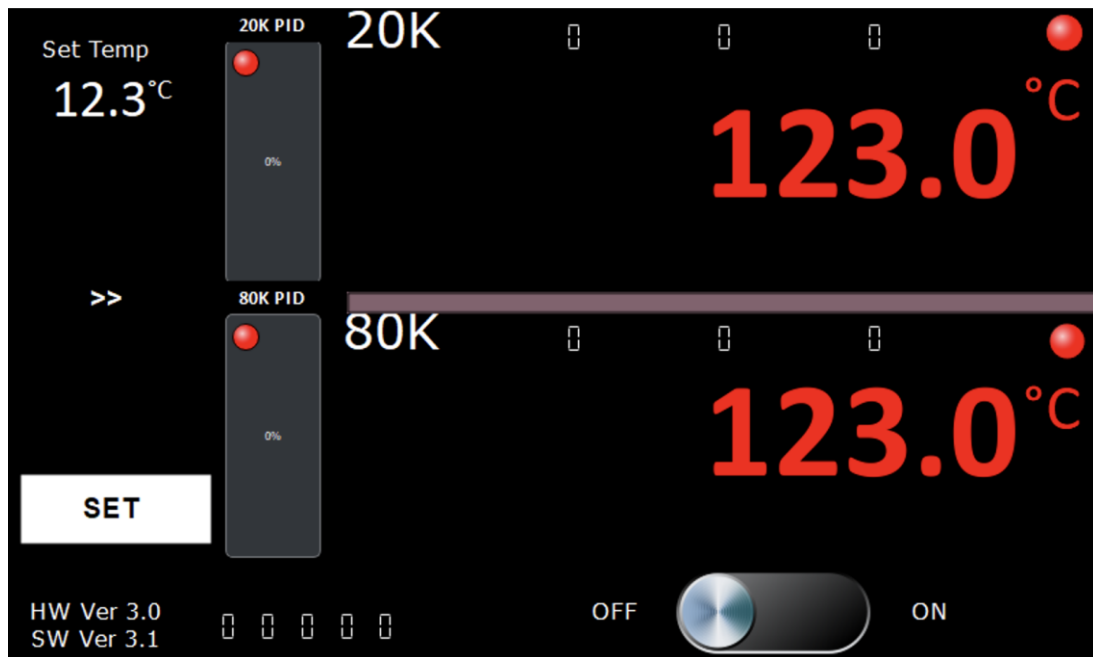


Illustration 4-5: Heater Operation and Temperature Monitoring

4.3.6 Monitor both the 20K and 80K temperatures while the heaters are operating.

4.3.7 Allow both temperatures to remain around the requested setpoint for approximately 10 minutes.

4.3.8 Continue the coldhead service in accordance with the applicable OEM service documentation.

4.4 Service Screen:

4.4.1 Connect test box to connector at the back of the Heater controller box.

4.4.2 Press the arrow key on the touchscreen to open the Service Screen,

4.4.3 The Service Screen provides separate manual controls for the 20K and 80K heaters.

CAUTION: The 20K and 80K heater controls on the Service Screen operate without temperature feedback or PID control. A magnet quench may be the result!

4.4.4 Turn ON the 80K heater and verify that only the displayed 80K temperature increases.

4.4.5 Turn OFF the 80K heater.

4.4.6 Turn ON the 20K heater and verify that only the displayed 20K temperature increases.

4.4.7 Turn OFF the 20K heater.

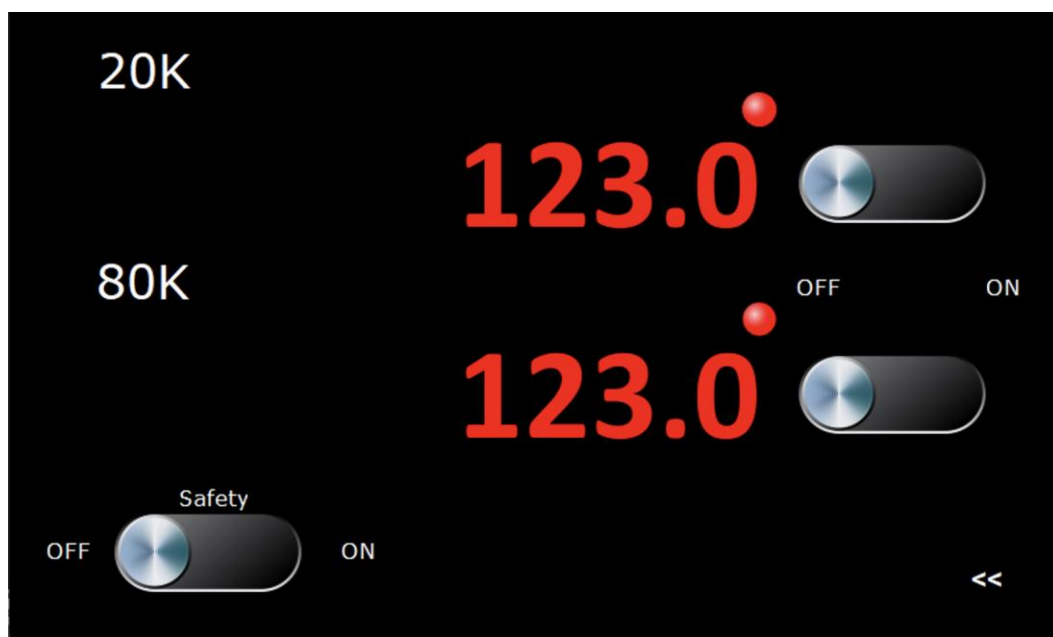


Illustration 4-8: Manual 20K and 80K Heater Controls

5. STORAGE AND MAINTENANCE

5.1 Storage:

5.1.1 After completion of the coldhead service, disconnect and restore the system in accordance with the applicable OEM service documentation.

5.1.2 Confirm that the Heater Controller is switched OFF and disconnected from the AC power supply before storage.

5.1.3 Inspect the Heater Controller, cables, tools, hoses, adapters, and fittings for visible damage or contamination after use.

5.1.4 Return all components to their designated positions in the Flight Case. Ensure that cables and hoses are stored without sharp bends, compression, or strain on their connectors.

5.1.5 Store the complete kit in a clean and dry location. Keep the Flight Case closed when the kit is not in use.

5.2 Maintenance:

5.2.1 Keep the Heater Controller, connectors, tools, hoses, adapters, and fittings clean and free from dust, moisture, oil, and debris.

5.2.2 Do not use components that are damaged, excessively worn, contaminated, or missing required parts.

5.2.3 Replace a Heater Controller fuse only with the specified fuse type and rating. Do not bypass or modify the fuse protection.

5.2.4 Do not open or modify the Heater Controller. Internal inspection and repair shall be performed only by authorized service personnel.

5.2.5 Replace damaged or defective kit components before the next coldhead service operation.