CLASS 22-A501 HOIST DRIVE

SYSTEMS TESTS AND ADJUSTMENTS

A. INITIAL ADJUSTMENTS

1. Power OFF
   a. Open main line circuit breaker, control circuit breaker and blower circuit breaker (if used).
   b. Hand operate relays and contactors to check for freedom of movement.
   c. Check all connections for tightness.
2. POWER ON
   a. Close main line circuit breaker.
   b. Close control and blower (if used) circuit breakers.
   c. Observe that phase sequence indicator shows correctly. If not interchange two incoming main line leads.
   d. Master relay picks up and seals itself in. The drive is now ready for use.

B. RUNNING THE DRIVE

When starting the drive, make sure there is no load on the hook and that the hook is well clear of the limit switch. Move the hoist master switch (or pendant station if used) just enough to energize the drive in the hoist direction and observe that the brake releases and the drive moves at slow speed in the hoist direction.

If the drive does not hoist at slow speed, correct as follows:

1. Hoisting at full speed - Interchange pilot generator leads PGT1 and PGT2.
2. Lowering at full speed - Interchange main line motor leads T1 and T3.
3. Lowering at slow speed - Interchange main line motor leads T1 and T3 and pilot generator leads PGT1 and PGT2.

The hoisting or lowering speed of the drive is dependent upon the position of the master switch. The further the master switch (or pendant station button) is moved, the faster the drive will run.

C. STOPPING THE DRIVE

Returning the master switch to OFF (or releasing pendant button) removes the reference signal to the thyristor amplifier and de-energizes the brake relay B and timing relay TR. This removes power from the motor and sets the brake. When TR times out, TR contact opens to de-energize the main line contactor M. When the contacts of M open, the motor is completely isolated from the power source.

D. UP LIMIT SWITCH

Return the empty hook into the Up Stop switch at low speed. Drive should de-energize. Return the master switch to Off. The drive will not be energized if the master switch or pendant is moved in hoist direction, but should power out of the overtravel if the master switch or pendant is moved in the Lower direction.

To be sure of enough mechanical clearance between the hook and bridge frame, continue to run the hook into the Up Stop limit switch at ever increasing speeds to maximum speed. This will show the maximum distance required to set the brake and arrest hook motion safely.

E. DOWN LIMIT SWITCH (IF USED)

Operation of the Down limit switch is the same as the Up Stop limit switch except in the opposite direction. The drive will not be energized if master switch or pendant is moved in the Lower direction, but will power out of the overtravel when control is moved in hoist direction.

DESCRIPTION OF OPERATION

The hoist drive controller is a Class 22-A501 static reversing, speed regulated controller.

The control description that follows is written with respect to the schematic diagram which is included in the drawing section of this manual.

A. STANDBY CONDITIONS

To place the equipment in a standby condition ready for normal operation, a certain sequence of operations must be performed to properly energize the control. These operations are as follows, beginning with the assumption that the equipment is completely de-energized with circuit breakers open, and the master switch in the OFF position (or pendant buttons released).

Close main power breaker 1CB, control breaker 2CB and blower breaker 3CB (if used) to apply 460 volts, 3 phase, 60 Hertz excitation to the following circuits:

Breaker 1CB applies primary excitation, dependent upon the closing of the main contactor to the motor.

Breaker 2CB applies excitation to the primary of control transformer and the regulator.

Breaker 3CB (if used) applies excitation to blower systems for cooling thyristors on motor or both.

With the master switch in the OFF position, or pendant buttons released, and PSD contacts closed, master relay MR will pick up. A contact of relay MR will close to seal itself in and supply excitation to the rest of the control circuits.

Relay MR will remain picked up throughout normal operation of the drive but will drop out to shut down the control in the event of low voltage,Up Stop limit switch,or motor overload.

The drive may now be considered in a standby condition, ready for operation.

NOTE: If incorrect, or open phase should occur, phase sequence indicator will indicate this condition, contact PSD will open, and shut the drive down.

B. HOISTING OPERATION

Moving the master switch or pendant button in the HOIST direction will energize the brake contactor B and timer. Main contactor M will be energized through a closed contact of timer. In the hoist direction the drive brake will release and slow hoisting speed will be provided independent of hook load. As the master switch is moved further from OFF, hook speed will increase steplessly in response to the master switch position. At the end of the master switch or pendant travel, the drive will accelerate to maximum hoist speed. The drive can be decelerated by motor braking at any time by returning the master switch or pendant to a slower speed position.

The thumb switch (if used) is usable to position critical loads. With the thumb switch depressed, the brake is held released regardless of master switch position and the speed reference is stepless right to zero speed.

C. LOWERING OPERATION

In the lower direction, the brake releases and the lowering speed obtained will be stepless and dependent on master switch position. At the end of the master switch or pendant travel, the hook will accelerate to the maximum lowering speed.

The drive will quickly decelerate by motor braking when the master switch is returned to OFF or pendant is released. By this means, holding brake wear is minimized.

D. STOPPING THE DRIVE

Moving the master switch from any position to OFF will remove reference signal from the speed controller, thereby removing voltage from the motor, and will also de-energize relay B, thereby setting the brake and stopping the drive.

E. LIMIT SWITCHING

If a limit switch is tripped, return the master switch to OFF. After a few seconds delay for timer to time out, the drive can be energized in a direction to power out of the limit switch.

F. PROTECTIVE FEATURES

Overload protection is provided by motor overload relays. When an overload occurs, the contact of one or more overload relays will open to drop out master relay MR. A contact of MR will open,de-energizing main line contactor M,causing the motor to be de-energized.

Visual indication is provided for lost or reverse phase of the power supply.

TROUBLESHOOTING

A. MAIN CIRCUITS

If motor amperes are appreciably different from normal, check motor and resistor circuit wiring for completeness and agreement with schematic diagram.

B. CONTROL CIRCUITS

1. Master relay MR

Power on. Master switch or pendant in Off, MR does not pick up.

Check for:

AC power available
Control circuit breaker open or tripped
Overload relay contact open
86Y relay picked up
Control fuse open

2. Brake Circuit

If the holding brake does not release, check for mechanical binding, coil excitation when the brake contactor is picked up, or circuit continuity.