CLASS 22-529 CASCADE BRIDGE DRIVE

SYSTEMS TESTS AND ADJUSTMENTS

A. INITIAL ADJUSTMENTS

1. Power OFF
   a. Open main disconnect 1SW.
   b. Master switch in OFF or all pendant buttons released.
   c. Hand operate relays and contactors to check freedom of movement.
   d. Check all connections for tightness.

2. Power ON
   a. Close main disconnect 1SW.
   b. Push RESET button. Master relay MR and main contactor M pick up, and seal in.
   c. The drive is now in a standby condition.

B. CHECK DIRECTION OF MOTOR ROTATION

1. Disconnect #2 motor at its overload relay.
2. Operate drive at second point and observe rotation of #1 motor. If incorrect, interchange leads T1 and T3 at #1 overload relay.
3. Disconnect #1 motor at its overload relay, and reconnect #2 motor to its overload relay.
4. Operate drive at second point, and observe rotation of #2 motor. If incorrect, interchange leads T1 and T3 at #2 overload relay.
5. Reconnect #1 motor to its overload relay. Be sure motor is reconnected exactly the same as it was at the end of step b above.
6. Operate drive at first point, and observe rotation of No. 2 motor. If incorrect, interchange two leads at contactor CC.

C. CHECK PHASING OF MOTOR SECONDARY

If operation is not satisfactory in second point, interchange #2 motor secondary leads until its phase rotation is in phase with the secondary of #1 motor. This has now phased the motor secondaries for semi-synchrotie operation. In last point, the motors are in straight, duplex operation with separate secondary resistors for each motor.

D. RUNNING THE DRIVE

When starting the drive, make sure it is unloaded and well clear of the limit switches.

When moving bridge master switch or pendant button to first point, either FORWARD or REVERSE, observe that brakes release and that the drive starts to accelerate in the desired direction. In first point, motors are connected in cascade. Motors are connected in semi-synchrotie for intermediate positions, and in duplex for the last point. Drive torque is dependent upon position of the control.

E. STOPPING THE DRIVE

Returning the master switch to OFF or releasing the pendant button de-energizes the directional contactor, and allows the drive to coast un-til timing relay BBTR times out and the brake sets.

F. LIMIT SWITCHES (IF USED)

Run the drive into the forward limit switch at low speed. Drive will de-energize. Return the master switch to OFF (or release pendant button). The drive will not be energized if the control is moved in the forward direction, but will power out of the overtravel if the control is moved in the reverse direction. To be sure of enough mechanical clearance, continue to run the drive into the forward limit switch at ever increasing speeds to maximum speed. This will show the maximum distance required to stop the motion safely.

The reverse limit switch should be set up in the same manner as the forward limit switch.

DESCRIPTION OF OPERATION

The bridge drive controller is a Class 22-529 magnetic, reversing multi-point controller.

The control description that follows is written with respect to the schematic diagram located 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 functions must be performed, beginning with the assumption that the equipment is completely de-energized with the knife switch open, and the master switch or pendant buttons in the OFF position.

Close main disconnect 1SW to apply 460 volts, 3 phase, 60 hertz excitation to control transformer 1T. Depress RESET button to energize master relay MR and main contactor M, control transformer 2T. Upon closing of directional contactors BF, BR, and CC or 1DC and 2DC, the bridge motors are energized.

M and 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 or overload of any motor.

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

B. FORWARD OPERATION

Moving the control to first point forward energizes directional contactor BF. An interlock of BF closes to energize cascading contactor CC and timing relay BTR. Another interlock of BF closes to energize brake timer BBTR, and brake

contactor BB. Contacts of BF and CC close, placing the motors in series (cascading) with all secondary resistance in the rotor circuit. Brake timer BBTR, and brake contactor BB pick up to release the brake. The drive will now run at slow speed.

Moving the control to second point forward energizes BCR and B3TR. Energizing B3TR causes contactor CC to drop out. The dropping out of CC energizes 1DC and 2DC. The motors are now connected in semi-synchrotie (secondary resistances in parallel) with all secondary resistance in and the speed increases. When moving from second point to first point, relay B3TR provides a short time delay before the motors are re-connected in cascade.

As the control is moved toward last point forward, secondary contactors are energized to reduce secondary resistance, and thus increase motor torque.

In last point forward, the minimum secondary resistance is in the circuit, and the motors are running at maximum torque. At this point, the motors are in straight duplex operation as the secondary resistors are no longer in parallel.

C. REVERSE OPERATION

Reverse operation is similar to forward operation, except that the control is moved in the reverse direction, and contactor BR is energized in place of BF.

D. STOPPING THE DRIVE

Returning the master switch to OFF or releasing the pendant button de-energizes directional contactor BF or BR, and timer BBTR. The main contacts of BF or BR open to de-energize the motor. When BBTR times out, it de-energizes BB and sets the brake.

Timer BBTR provides an adjustable time delay between the dropping out of the directional contactor, and the setting of the brake.

E. PROTECTIVE FEATURES

The motors are protected from overload by overload relays 1BOL and 2BOL. If an overload occurs, contacts of these relays will open, de-energizing MR and M and thus removing all power from the crane. The crane must be reset before the drive can be restarted.

In the event of undervoltage, MR and M again will be de-energized and the crane must be reset before any drive can be restarted.

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. Main line contactor M

Main power RESET button depressed, M does not pick up.

Check for:

AC power available.

Crane disconnect switch 1SW open.

MR contact open.

Overload relay contact open.

STOP button contact open.

Fuse blown in M coil circuit (1FU)

115 volt control power from 1T not available.

2. Brakes

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

C. GENERAL

If the drive is malfunctioning from none of the above causes, the adjustment procedure outlined in the Systems Tests and Adjustments section should be followed in detail.