MICRO THERMO TECHNOLOGIES™

Designing a Low Temperature Rack with Dual-Temp EEPR Controllers

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Local Phone: (450) 668-3033 | Fax: (450)668-2695
Toll Free Canada: 1-888-664-1406 | Toll Free USA: 1-888-920-6284
www.sporlanonline.com/micro-thermo

1. Introduction

This document proposes a practical way of setting up a low temperature rack using EEPR (Electric Evaporator Pressure Regulator) valves controlled by the Micro Thermo Dual-Temp EEPR boards **950-636C**.

An example is given below, along with some guidelines.

Many variations are possible, within the specifications given in *Dual-Temp EEPR Site Engineering* (PUID 44-PHW-1001).

The present document discusses **network connections**, often referred to as "bindings". Although the OEM normally doesn't establish these network connections by himself, he needs to know how they will eventually be done in Alliance. Bindings influence the wiring.

2. Description of the Rack

We assume, in this example, that the low-temperature rack :

– uses hot gas defrost,

– has 16 ordinary circuits, and

– 2 Dual Temperature circuits serving islands, each with 4 Dual Temp cases.

This design requires 4 DT-EEPR boards and 4 MT-CKT boards.

Unless noted otherwise, it is assumed that Sporlan EEPR valves are used. Alco valves are not recommended for Dual Temp applications, because they do not provide the extremely fine control that is needed with small loads and large pressure differentials.

2.1 Associating DT-EEPR Valves with Circuits

The DT-EEPR board controls 6 valves, whereas the MT-CKT (Circuit Controller) is limited to 5 circuits (10 relays).

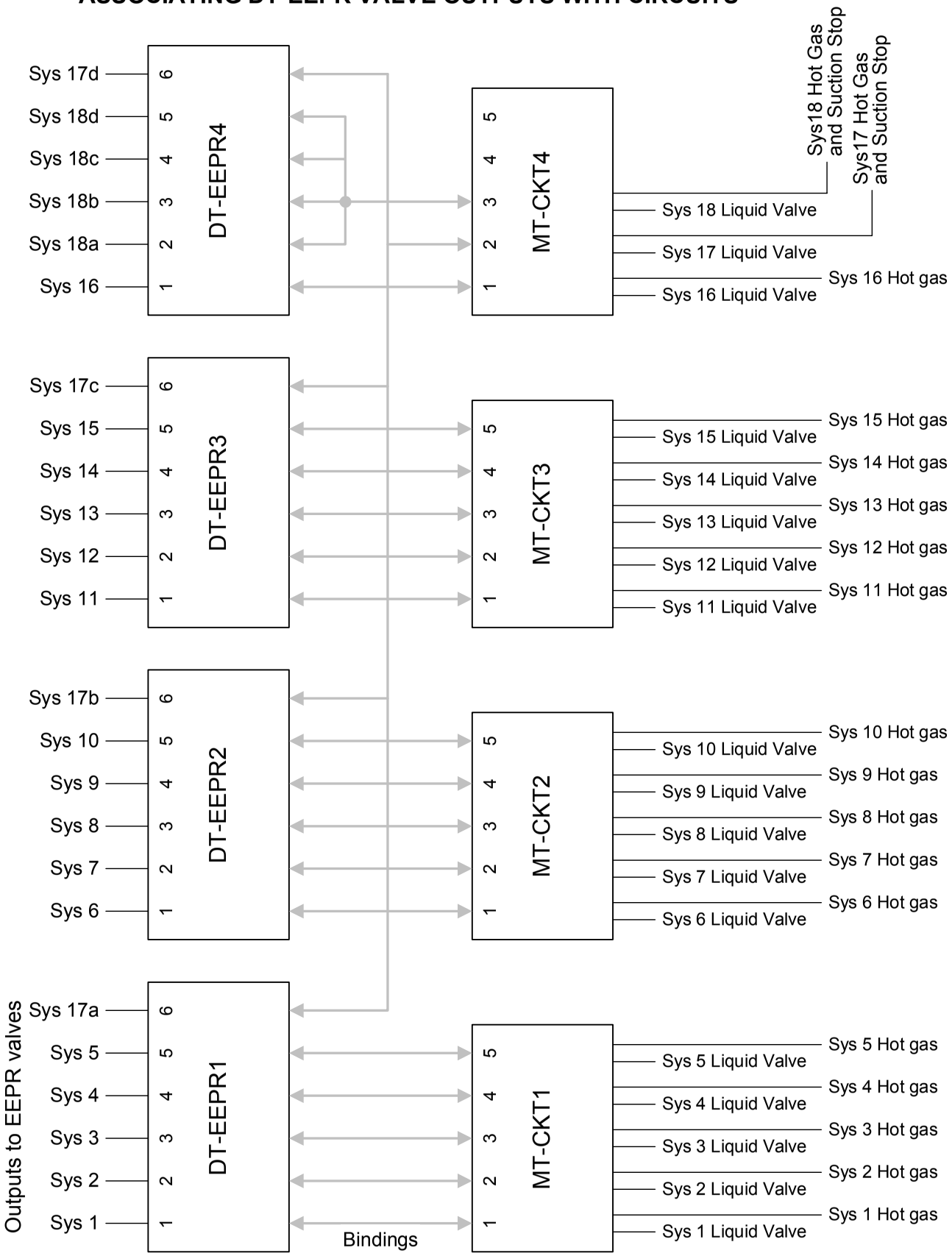
In this design, each circuit is associated with a valve bearing the same number : Circuit 1 with Valve 1, Circuit 2 with Valve 2, etc. The 6th drive of each DT-EEPR is reserved for the Dual Temp cases.

The design would be similar for Electric defrost, except that the second Circuit relay would drive the heating elements instead of opening the hot gas solenoid valve.

Liquid solenoid valves are shown, although they are not always provided.

The electrical design illustrated on the next page supports the control strategy. The grey arrows represent some of the network connections (bindings) to be established eventually by the plug-in, in Alliance.

ASSOCIATING DT-EEPR VALVE OUTPUTS WITH CIRCUITS



2.2 Details of DT-EEPR1 and MT-CKT1

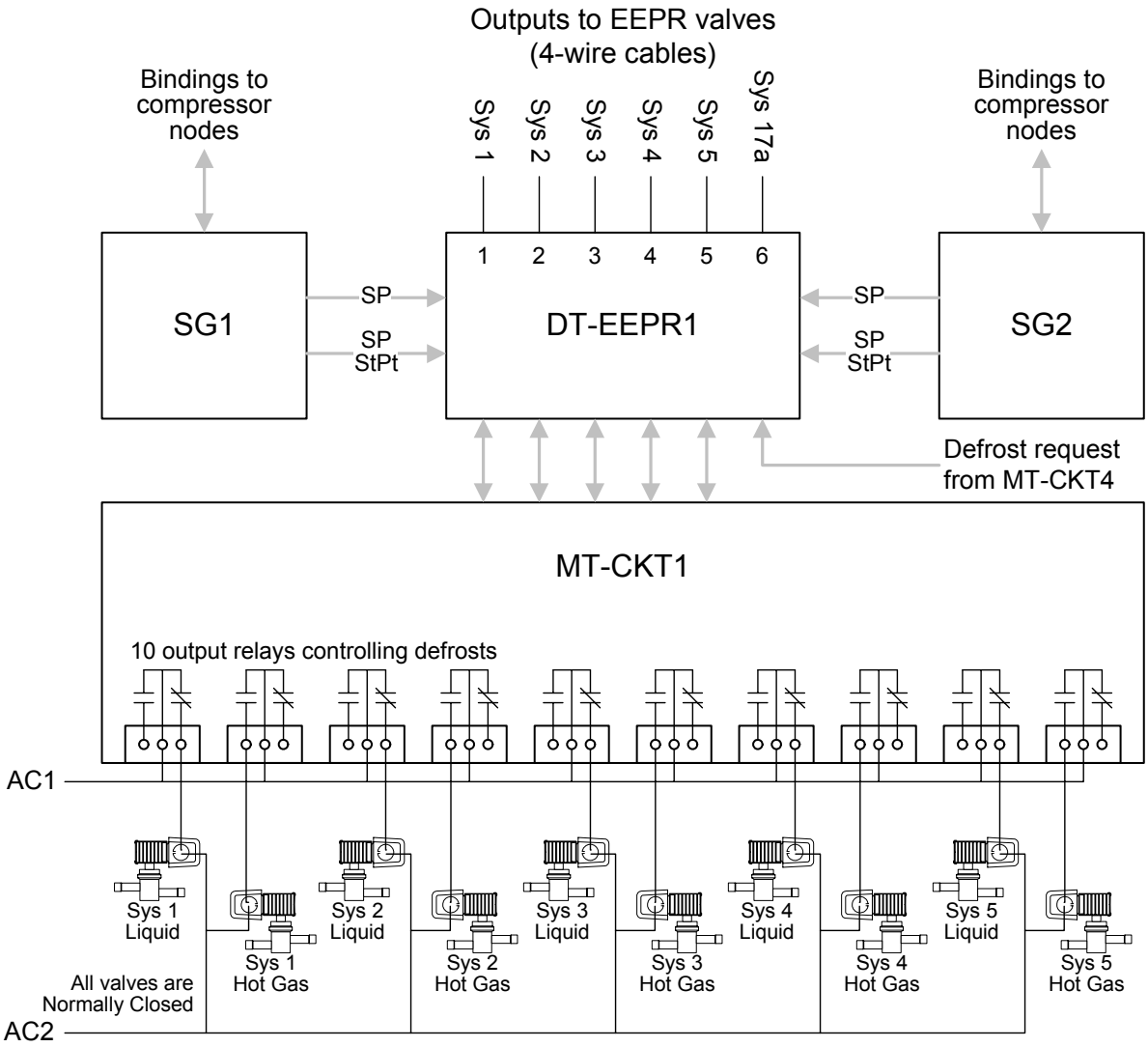
It is possible to have several suction groups. The limitation is that any given DT-EEPR controller supports only 2 suction groups.

We assume that Sys 1, 2 and 3 are on a Suction Group SG1, with a set point of –35°F, whereas Sys 4, 5 and 17 are on SG2 at –25°F. The piping and the bindings are affected by this, but not the wiring.

Piping considerations dictate that Dual-Temp valves be located inside (or very close to) the case. Provisions have to be made so that they can be connected after the rack is installed on site.

The figure below shows the wiring for the DT-EEPR1 and MT-CKT1 pair.

DETAILS OF WIRING FOR DT-EEPR1 AND MT-CKT1



The node DT-EEPR-1 receives the Suction Pressure (SP) and its Set Point (SPStPt) from Suction Groups SG1 and SG2, since some circuits are hooked up to SG1 and others to SG2.

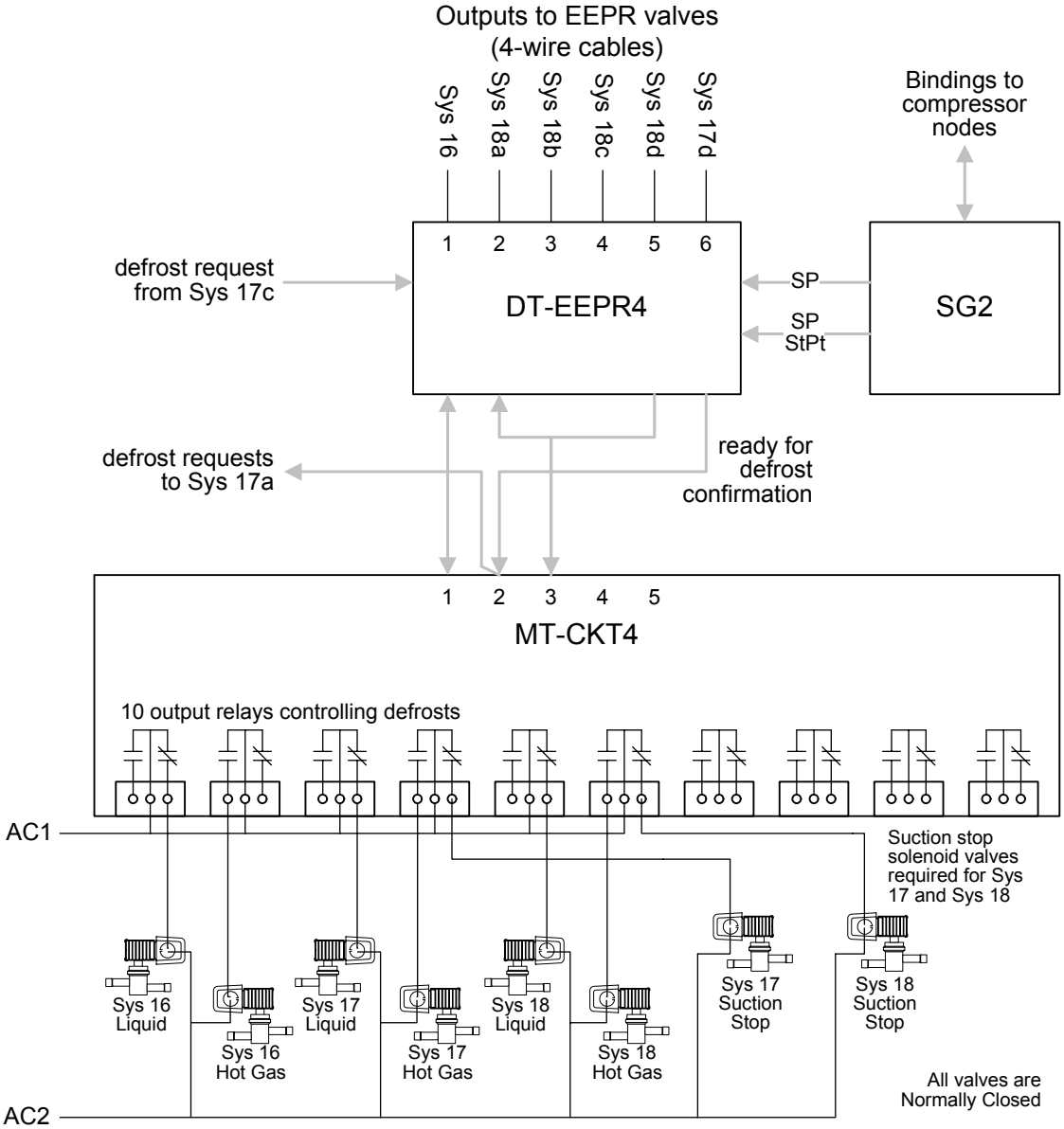
2.3 Details of DT-EEPR4 and MT-CKT4

The wiring of the pair DT-EEPR2 and MT-CKT2 is similar to the wiring of DT-EEPR-1 and MT-CKT1. So is the wiring of the third pair, DT-EEPR3 and MT-CKT3.

MT-CKT4 needs a different wiring, to control the 8 Dual Temp cases, in addition to the last single temperature circuit, Sys 16.

This is illustrated below. Grey lines represent bindings.

DETAILS OF WIRING FOR DT-EEPR4 AND MT-CKT4



In the drawing of the preceding page, Sys 16's defrosts are simply controlled by the first circuit on MT-CKT4. The circuit sends a request for defrost to Valve 1, which positions the EEPR valve, then confirms.

For Sys 17 and Sys 18, the procedure is more complex. Since the 4 cases of an island defrost simultaneously, 4 EEPR valves need to be positioned.

For Sys 17, the second Circuit on MT-CKT4 sends a request to the valve of Sys 17a (Valve 6 on DT-EEPR1). The message is forwarded immediately to the other 3 valves of Sys 17. When all 4 valves are positioned for defrost, Sys 17d (Valve 6 on DT-EEPR4) sends a confirmation to Circuit 2 of MT-CKT4.

All the bindings which are necessary for defrost are done automatically by the plug-in.

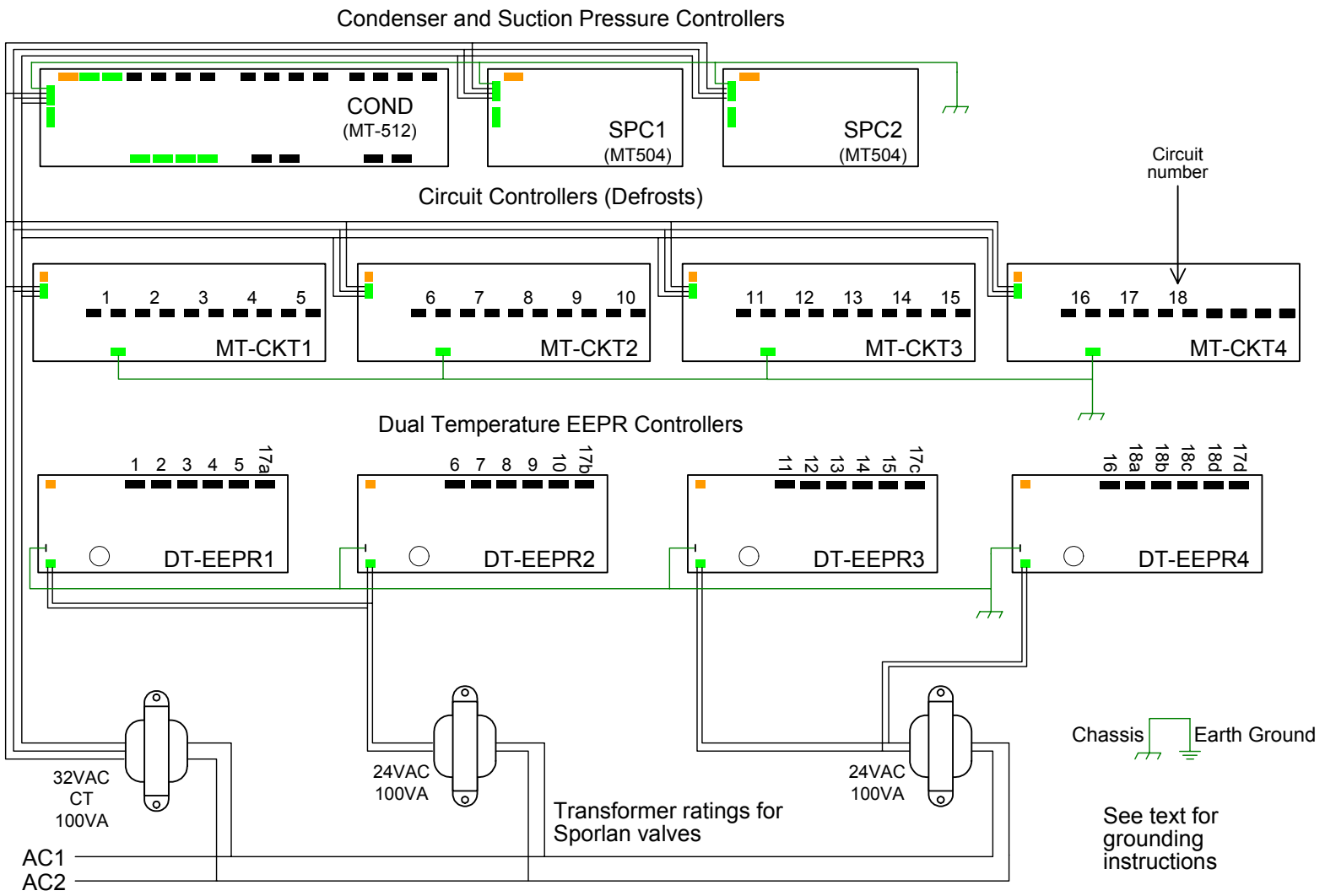
According to the above described mechanism, the EEPR valves of a Dual Temp island need not be on the same controller.

Hot gas defrosts of a Dual Temp island are normally done by circulating hot gas through the opened EEPR valves. Therefore, a **Suction Stop** solenoid valve is provided at the rack, as illustrated.

3. Cabinet Wiring

The figure on the next page shows the cabinet wiring that is required to power the controllers.

Each DT-EEPR controller requires **2.1 amperes** when driving Sporlan valves. A controller driving Alco valves needs 3.4 amperes. Details of voltage and power requirements are given in *Dual Temp EEPR Engineering Specifications for DT-EEPR Site Installation*.



TYPICAL CABINET FOR LOW TEMPERATURE RACK

Revisions History

REV	Description	Revised by	Date
0.1	Document Creation	CB	01-Mar-07
1.0	Document Approved	AH	12-Mar-07
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