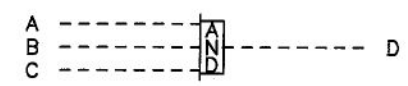


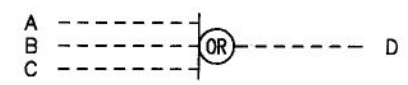
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"AND"



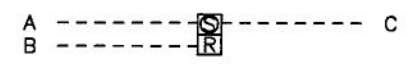
OUTPUT "D" IS LOGIC "1" WHEN ALL INPUTS "A", "B" AND "C" ARE A LOGIC "1".

"OR"



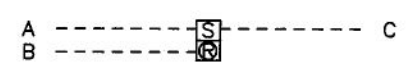
OUTPUT "D" IS LOGIC "1" WHEN ANY INPUTS "A", "B" OR "C" ARE A LOGIC "1".

MAINTAINED
MEMORY



OUTPUT "C" IS SET TO A LOGIC "1" WHEN INPUT "A" IS OR HAS BEEN A LOGIC "1".
OUTPUT "C" WILL REMAIN A LOGIC "1" UNTIL INPUT "B" IS A LOGIC "1" AND INPUT "A" IS A LOGIC "0".
(SET OVERRIDES RESET)

MAINTAINED
MEMORY



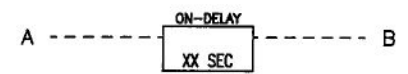
OUTPUT "C" IS SET TO A LOGIC "1" WHEN INPUT "A" IS OR HAS BEEN A LOGIC "1".
OUTPUT "C" WILL REMAIN A LOGIC "1" UNTIL INPUT "B" IS A LOGIC "1".
(RESET OVERRIDES SET)

LOGICAL NOT



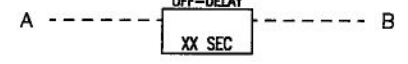
OUTPUT "B" IS ALWAYS THE INVERTED STATE OF INPUT "A".

ON DELAY
TIMER



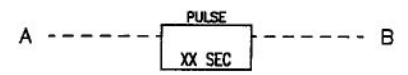
OUTPUT "B" IS A LOGIC "1" AFTER INPUT "A" HAS BEEN A LOGIC "1" GREATER THAN THE STATED TIME. OUTPUT "B" IS A LOGIC "0" WHEN INPUT "A" IS A LOGIC "0".

OFF DELAY
TIMER



OUTPUT "B" IS A LOGIC "1" IMMEDIATELY WHEN "A" IS A LOGIC "1".
OUTPUT "B" WILL RETURN TO A LOGIC "0" TO A LOGIC "0" AFTER THE STATED TIME.

PULSE
TIMER



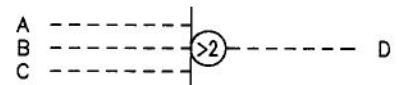
OUTPUT "B" IS A LOGIC "1" IMMEDIATELY WHEN "A" IS A LOGIC "1". WHEN INPUT "A" RETURNS TO LOGIC "0", OUTPUT "B" IS A LOGIC "1" FOR THE DURATION OF THE STATED TIME, AND INPUT "A" IS A LOGIC "1" THEN RETURNS TO A LOGIC "0".

ONE SHOT
TIMER

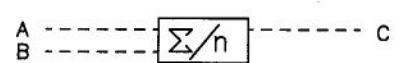


OUTPUT "B" IS A LOGIC "1" IMMEDIATELY WHEN "A" IS A LOGIC "1". OUTPUT "B" RETURNS TO LOGIC "0" AFTER ONE SCAN OF THE APPLICATION.

QUALIFIED LOGICAL
X OF Y COUNTER



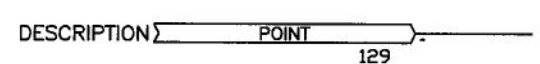
COUNTER OUTPUT "D" IS A LOGIC "1" WHEN THE NUMBER OF INPUTS THAT ARE A LOGIC "1" SATISFIES THE CONDITION SHOWN.



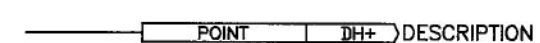
OUTPUT "C" IS A MATHEMATICAL AVERAGE BETWEEN INPUTS "A" AND "B"



INTERNALLY GENERATED LOGIC SIGNAL (POINT) DIRECTED TO ANOTHER SHEET OF LOGIC. THE NUMBER INSIDE THE BOX REPRESENTS THE FIRST DESTINATION LINE NUMBER, ADDITIONAL DESTINATION LINE NUMBERS ARE SHOWN BELOW THE SYMBOL.



INTERNALLY GENERATED LOGIC SIGNAL (POINT) DIRECTED TO THIS SHEET OF LOGIC. THE NUMBER INSIDE THE BOX REPRESENTS SOURCE SIGNAL LINE NUMBER.



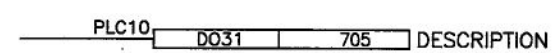
LOGIC SIGNAL TO A DATA HIGHWAY OR COMMUNICATION LINK AND THE ASSOCIATED ADDRESS (ADDR).



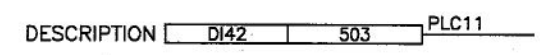
LOGIC SIGNAL FROM A DATA HIGHWAY OR COMMUNICATION LINK AND THE ASSOCIATED ADDRESS (ADDR).



INDICATES MEMORY BIT TRANSFER TO DCS AND/OR HMI



HARDWIRED OUTPUT INCLUDING THE PLC ADDRESS (DO31) AND SCHEMATIC LINE NUMBER (705) WHERE THE CARD RESIDES.



HARDWIRED INPUT INCLUDING THE PLC ADDRESS (DI42) AND SCHEMATIC LINE NUMBER (503) WHERE THE CARD RESIDES

ANALOG SIGNALING

DIGITAL SIGNALING

NOTES:

1. BURNER MANAGEMENT SYSTEM (BMS) IS DESIGNED AS FAIL SAFE, I.E. DE-ENERGIZED TO TRIP.
2. INPUT DEVICES AND LOGIC SEGMENTS ARE DEPICTED AS FOLLOWS:
STATED CONDITION IS LOGIC VALUE 1
NON-STATED CONDITION IS LOGIC VALUE 0
3. LOGIC FLOW WILL ALWAYS BE FROM LEFT TO RIGHT THROUGH ANY LOGIC GATE.
4. TYPICAL CROSS-REFERENCE EXAMPLE: =S/305
REFERENCES THE SCHEMATIC DIAGRAM SHEET 3, LINE 05.
=L REFERS TO THE LOGIC DIAGRAM.

ABBREVIATIONS:

- BMS - BURNER MANAGEMENT SYSTEM
- DB - DUCT BURNER
- DCS - DISTRIBUTIVE CONTROL SYSTEM
- F.O. - FIRST OUT (CAUSE OF TRIP)
- FTC - FAILED TO CLOSE
- FTO - FAILED TO OPEN
- GT - GAS TURBINE
- HMI - HUMAN-MACHINE INTERFACE (LOCATED AT BMS CABINET)
- HRSG - HEAT RECOVERY STEAM GENERATOR
- I/P - CURRENT PRESSURE TRANSDUCER
- MFT - MASTER FUEL TRIP
- MFTFO - MASTER FUEL TRIP FIRST OUT
- PRESS - PRESSURE
- SSO - SAFETY SHUTOFF
- TEG - TURBINE EXHAUST GAS
- TEMP - TEMPERATURE

MEC/KMEC
Duct Burner-BMS Logic Diagram

VOGT POWER INTERNATIONAL
V17494-BUXD-5006-03
25-May-2016

VOGT POWER INTERNATIONAL	
Released, Work May Proceed	
Bell, Milton	May-31-2016

MAY 18 2016

MIDDLETOWN PROJECT
MIDDLETOWN, OH
VPI PROJECT #: V17494
VPI PO #: V0009467

KINGS MOUNTAIN PROJECT
KINGS MOUNTAIN, NC
VPI PROJECT #: V17495
VPI PO #: V0009986

D		5/17/16	JH	CJ	CGS	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.	TITLE MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM LEGEND	FORNEY® Forney Corporation				
A		11/25/15	JH	CJ	CGS	FIRST SUBMITTAL				CONTRACT B10238	SCALE NONE	SIZE 1 OF 24	DRAWING NUMBER B10238-071-01	REV D
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TABLE OF CONTENTS

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10	IGNITER GAS - 2
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12	ELEMENT 1 IGNITER GAS - 1 (TYPICAL)
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PROJECT REFERENCE DOCUMENTS

DOC ID	DESCRIPTION	DRAWING NUMBER
1	BILL OF MATERIAL	B10238-000-01
2	FUEL SKID G.A.	B10238-030-01
3	BLOWER SKID G.A.	B10238-045-01
4	ELEMENT G.A.	B10238-020-01
5	P & ID	B10238-005-01
6	SCHEMATIC	B10238-070-01
7	CABINET	B10238-060-01
8	LOGIC	B10238-071-01
9	SEQUENCE	B10238-072-01
10	IO LIST	B10238-073-01
11	SYSTEM ARCHITECTURE	B10238-XXX-XX
12	BLOWER SKID JBOX	B10238-XXX-XX
13	BURNER FRONT JBOX	B10238-XXX-XX
14	HESI JBOX	402391-01
15	GRAPHICS SCREENS	B10238-074-01
16	FAT PROCEDURE	TBD-01
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DCS ALARM SILENCE ACTIVATED DCS SILENCE DCS 1971 ALARM SIL HMI ALARM SILENCE ACTIVATED

DCS SYSTEM RESET ACTIVATED

DCS_RESET	DCS
412	510 773 1069 1138
1237	1565 1683 1743 1882

DCS PURGE START ACTIVATED DCS PURGE START DCS PURGE START COMMAND 740

DCS BURNER START ACTIVATED


1BOPNLS001-BRNRSTR1

616	930	1423	1733	2305
DOOT	BORNER	NORMAL	STG	COMMAND

723	DB_BNR_STOP	DOCT BURNER NORMAL STOP COMMAND ACTIVATED
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[illegible]

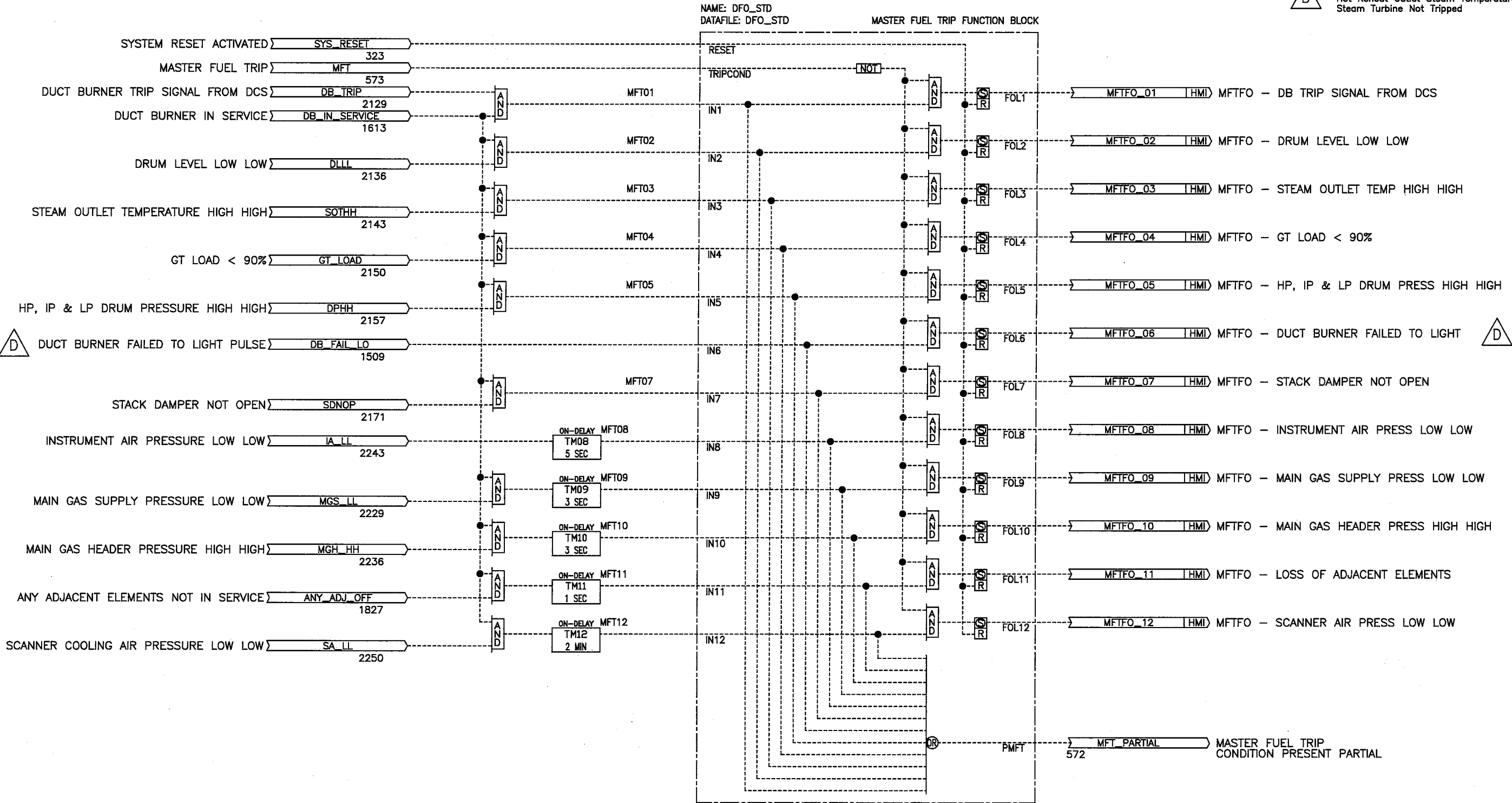
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A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL			CONTRACT B10238	SCALE NONE	SIZE B	DRAWING NUMBER B10238-071-01	REV D
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NOTE: NO DUCT BURNER TRIP SIGNAL IS A COMPOSITE SIGNAL
MADE UP OF THE FOLLOWING:

HP Steam Pressure Not High High
Reheat SH Outlet Steam Pressure Not High High
HPSH Outlet Steam Pressure Not Bad Quality
Hot Reheat Outlet Steam Pressure Not Bad Quality
HPSH Steam Temperature Not High High
Hot Reheat Outlet Steam Temperature Not High High
Steam Turbine Not Tripped



D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL
REV	DATE	DR	ENG	RWD	DESCRIPTION

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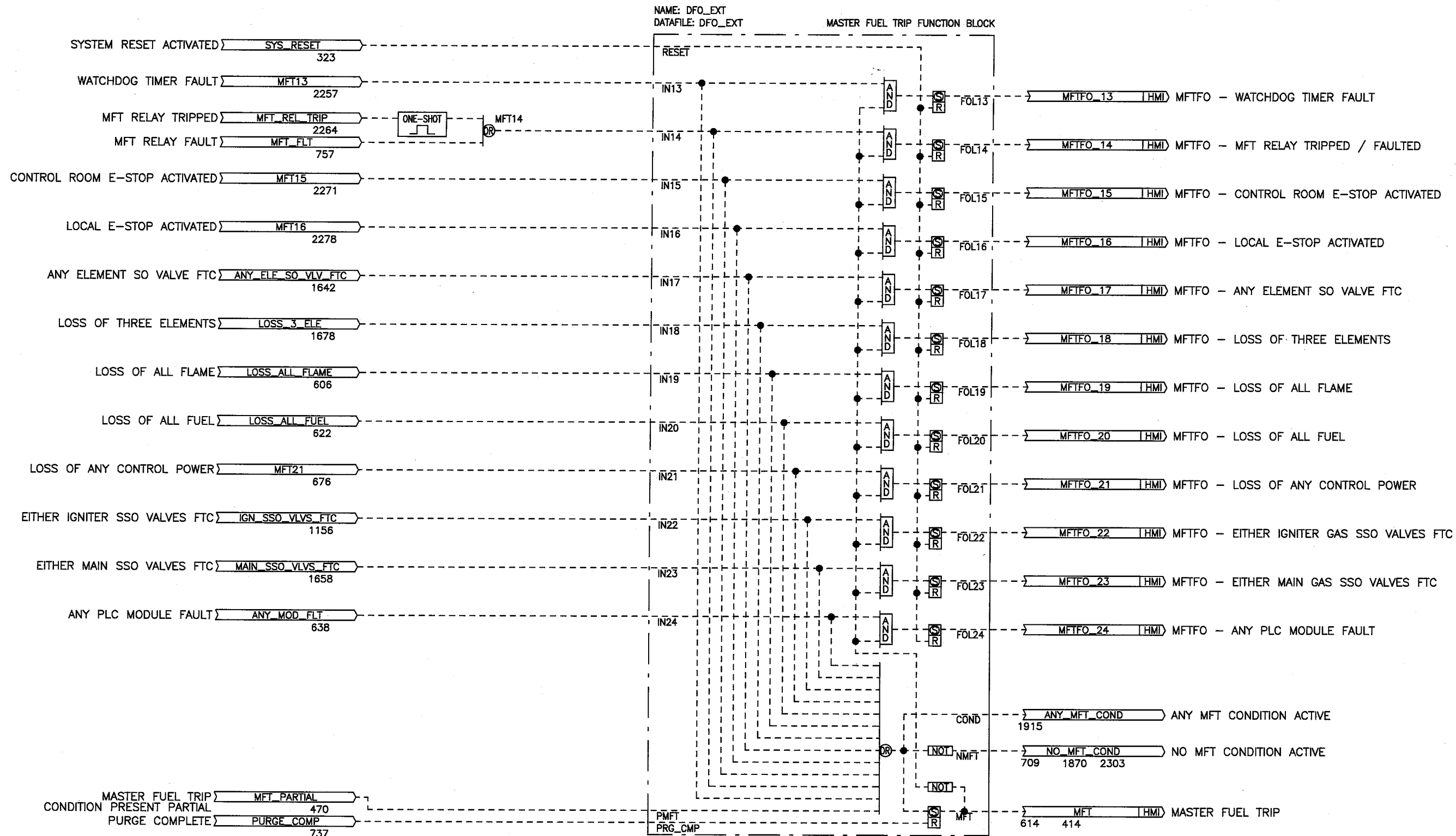
MIDDLETOWN / KINGS MOUNTAIN
DUCT BURNER
BMS LOGIC DIAGRAM
MASTER FUEL TRIPS - 1

CONTRACT		SCALE		SIZE		DRAWING NUMBER		REV	
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FORNEY[®]

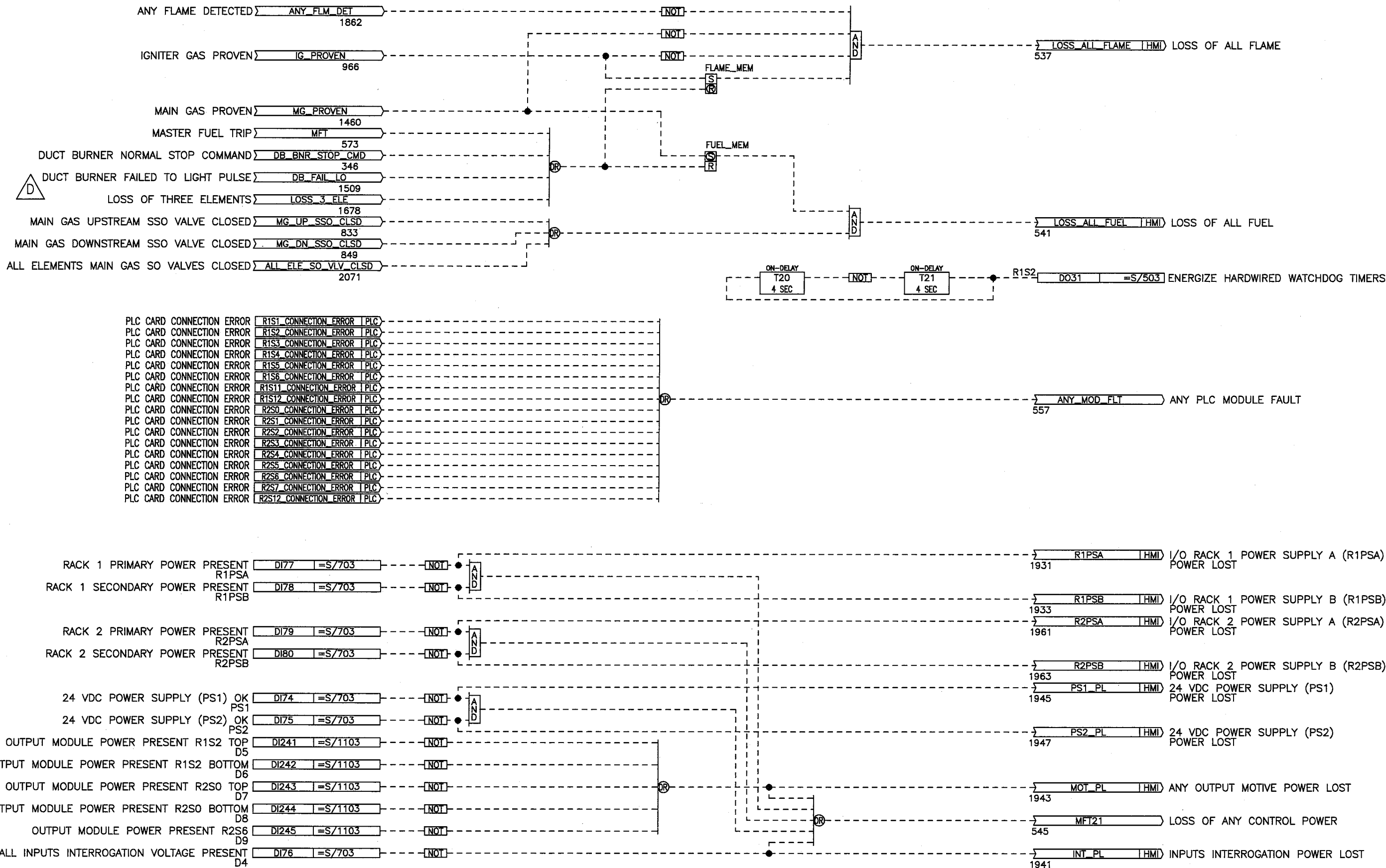
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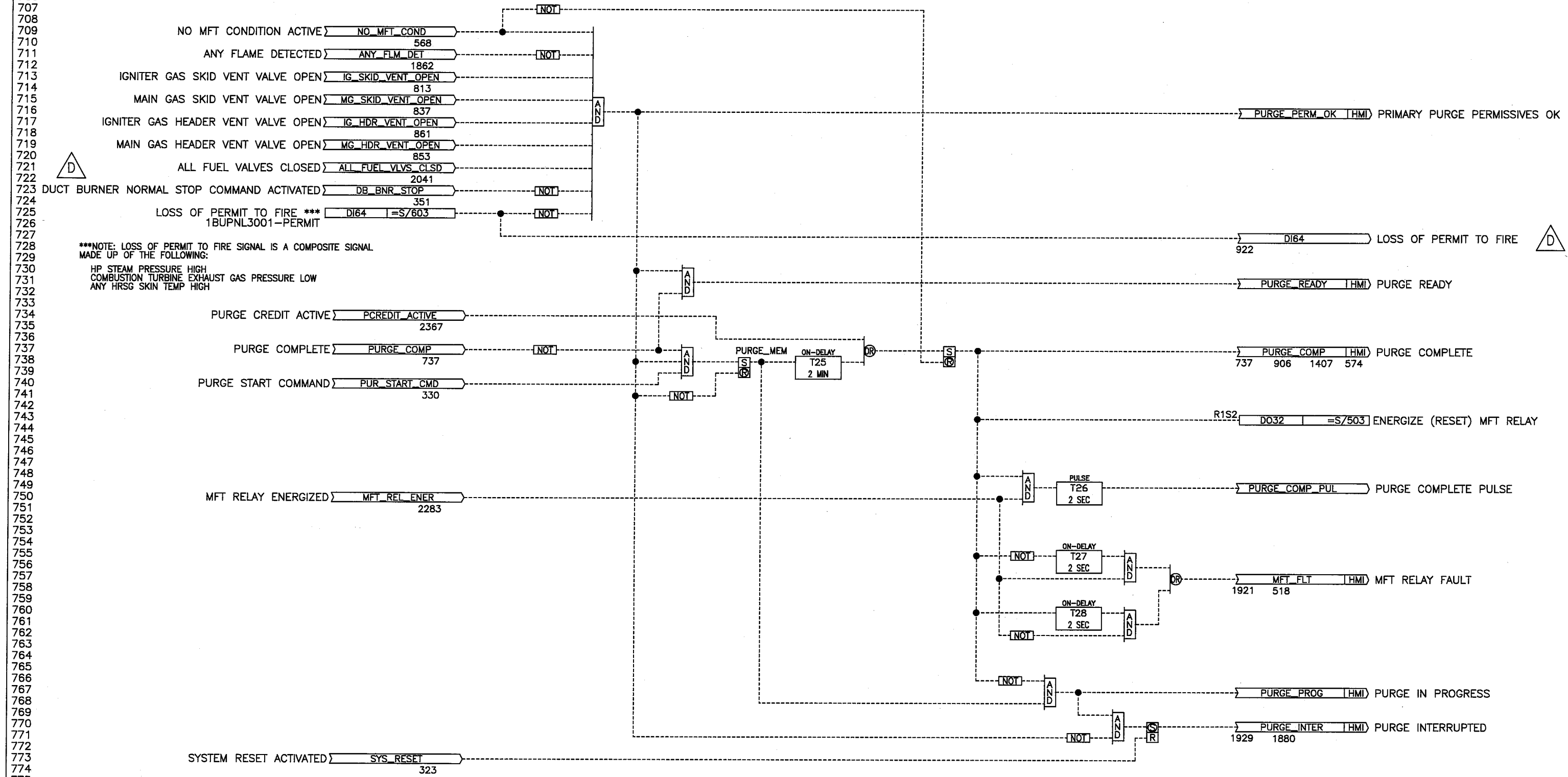


D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM MASTER FUEL TRIPS - 2	CONTRACT B10238	SCALE NONE	SIZE 5 of 24	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.						
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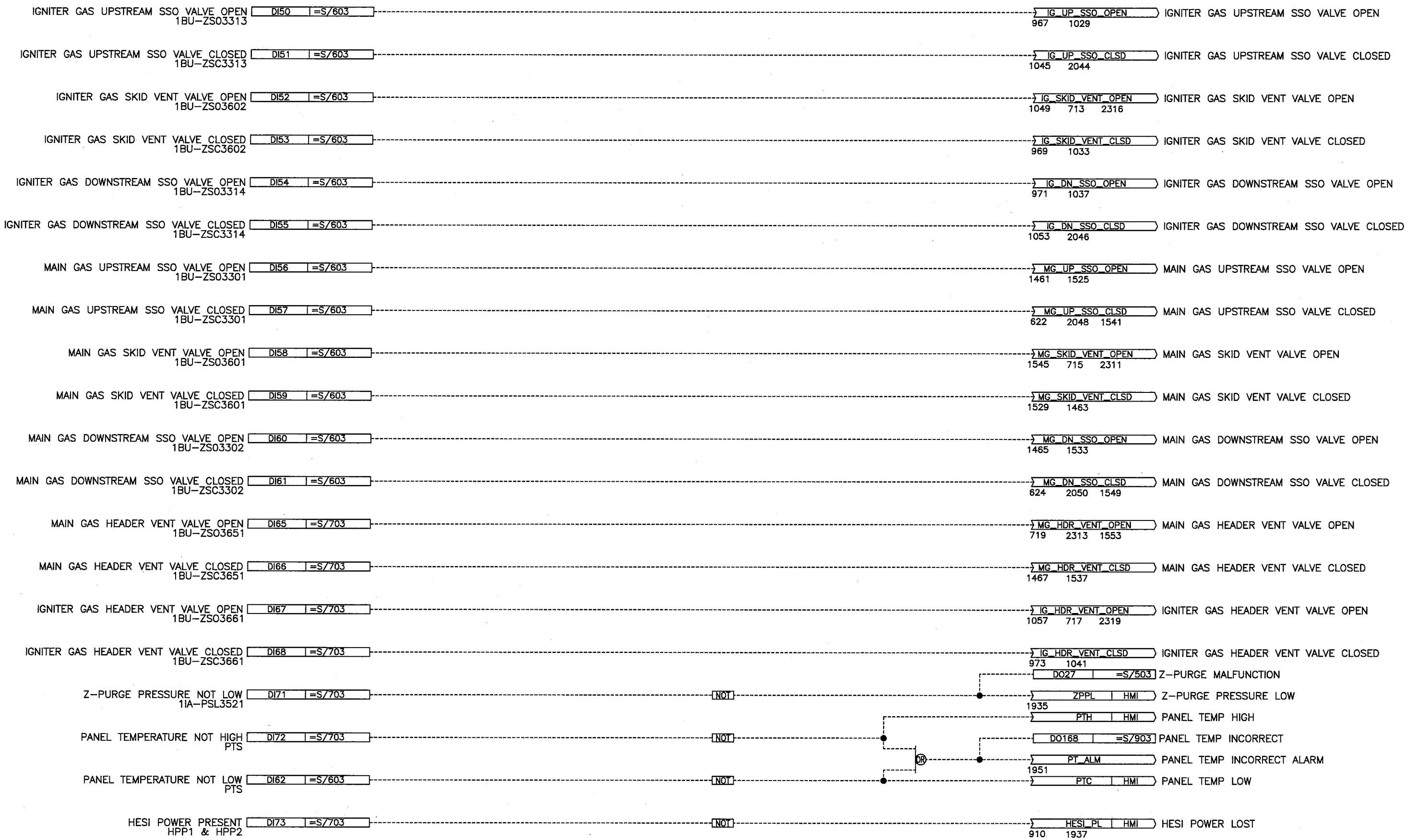



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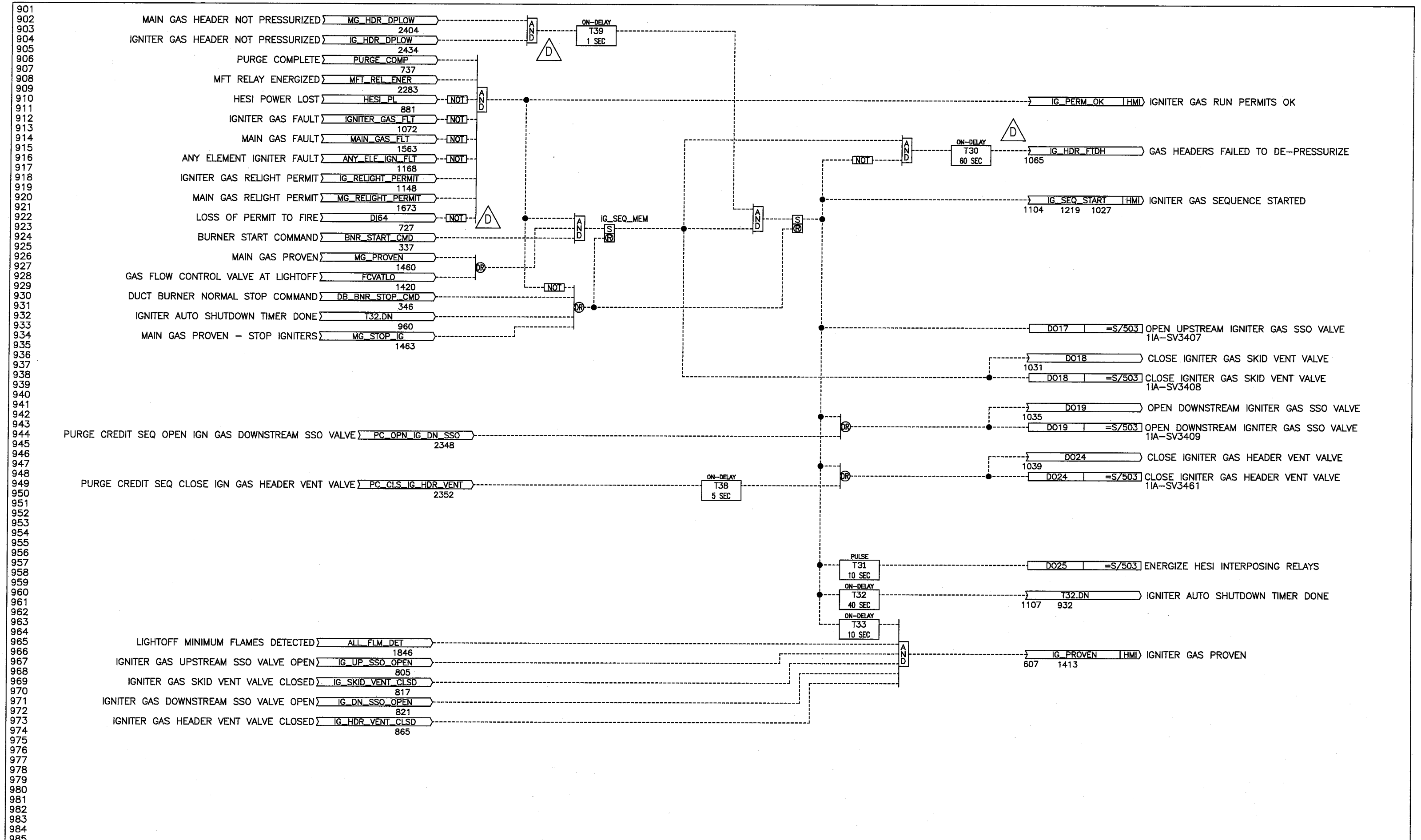


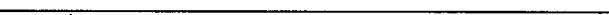
D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM PURGE	Forney Corporation	CONTRACT	SCALE	SIZE	DRAWING NUMBER	REV
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL				B10238	NONE	B	B10238-071-01	D
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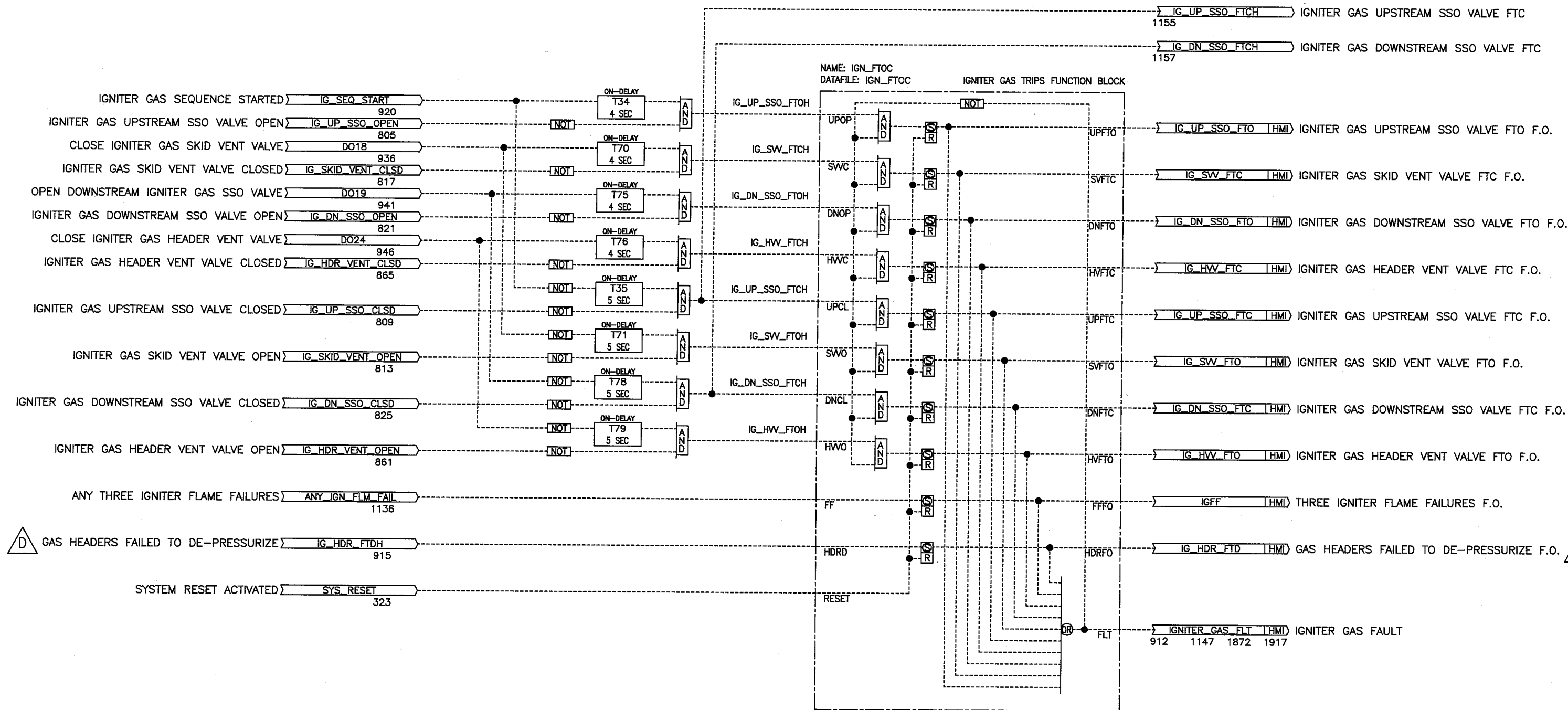


D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	TITLE MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM COMMON DIGITAL INPUTS	 Forney Corporation			
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REV	DATE	DR	ENG	RWVD	DESCRIPTION						
							CONTRACT B10238	SCALE NONE SHT 8 OF 24	SIZE B	DRAWING NUMBER B10238-071-01	REV D



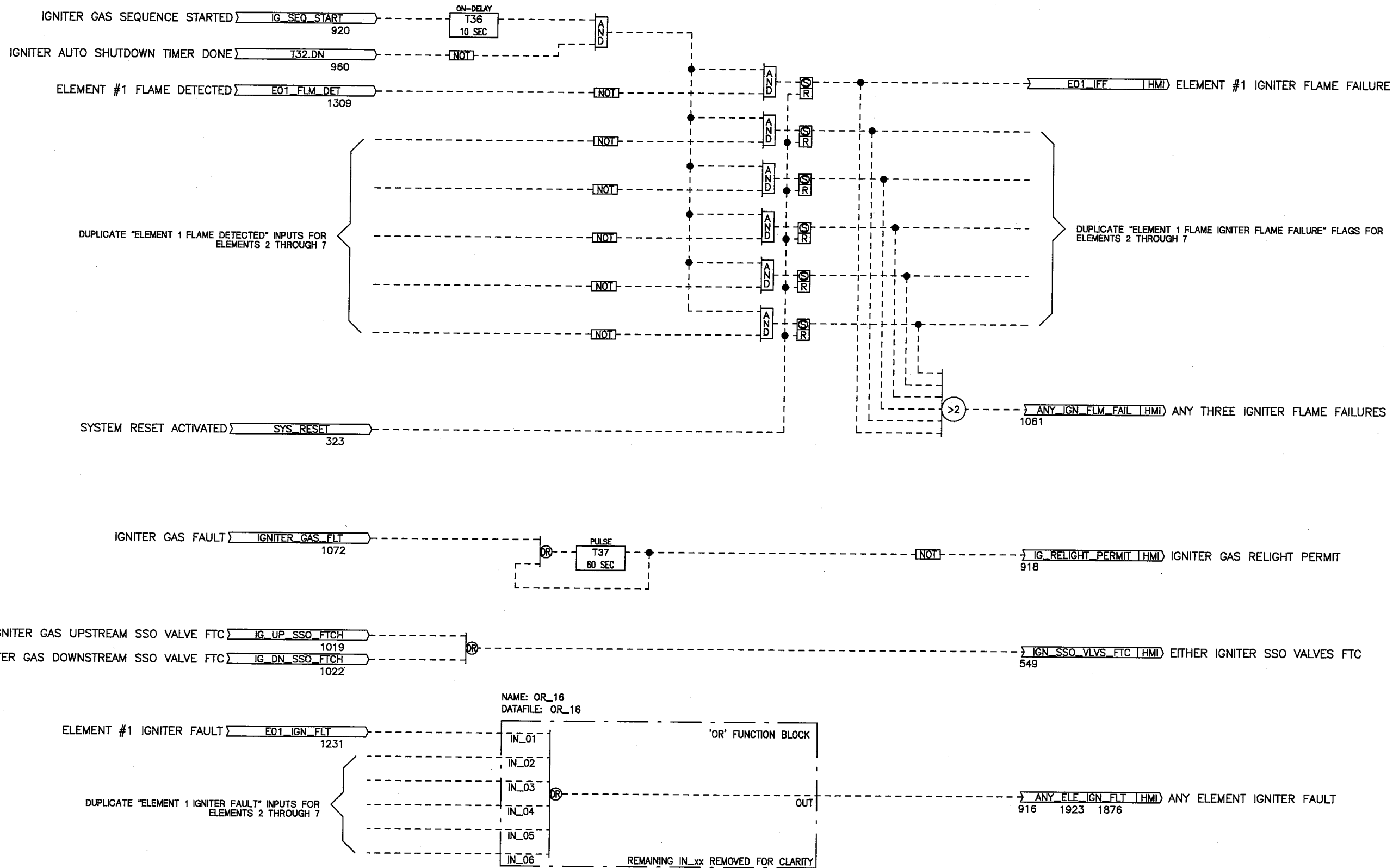
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A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL							
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						CONTRACT B10238			SCALE NONE SHT 9 OF 24	SIZE B	DRAWING NUMBER B10238-071-01	REV D

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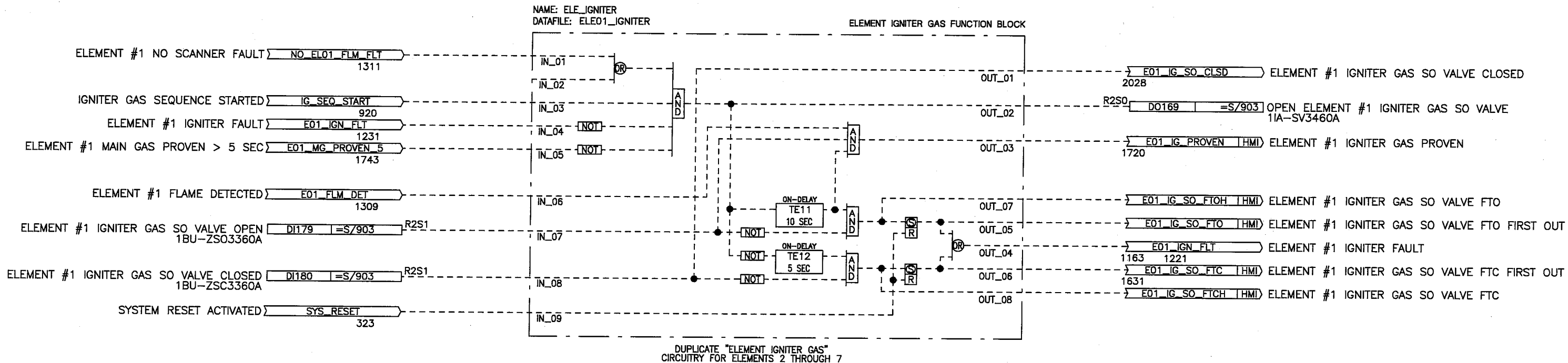
D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM IGNITER GAS - 2	CONTRACT B10238	SCALE NONE	SIZE B	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.						
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D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM IGNITER FLAME FAILURE	CONTRACT B10238	SCALE NONE	SIZE 11	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.						
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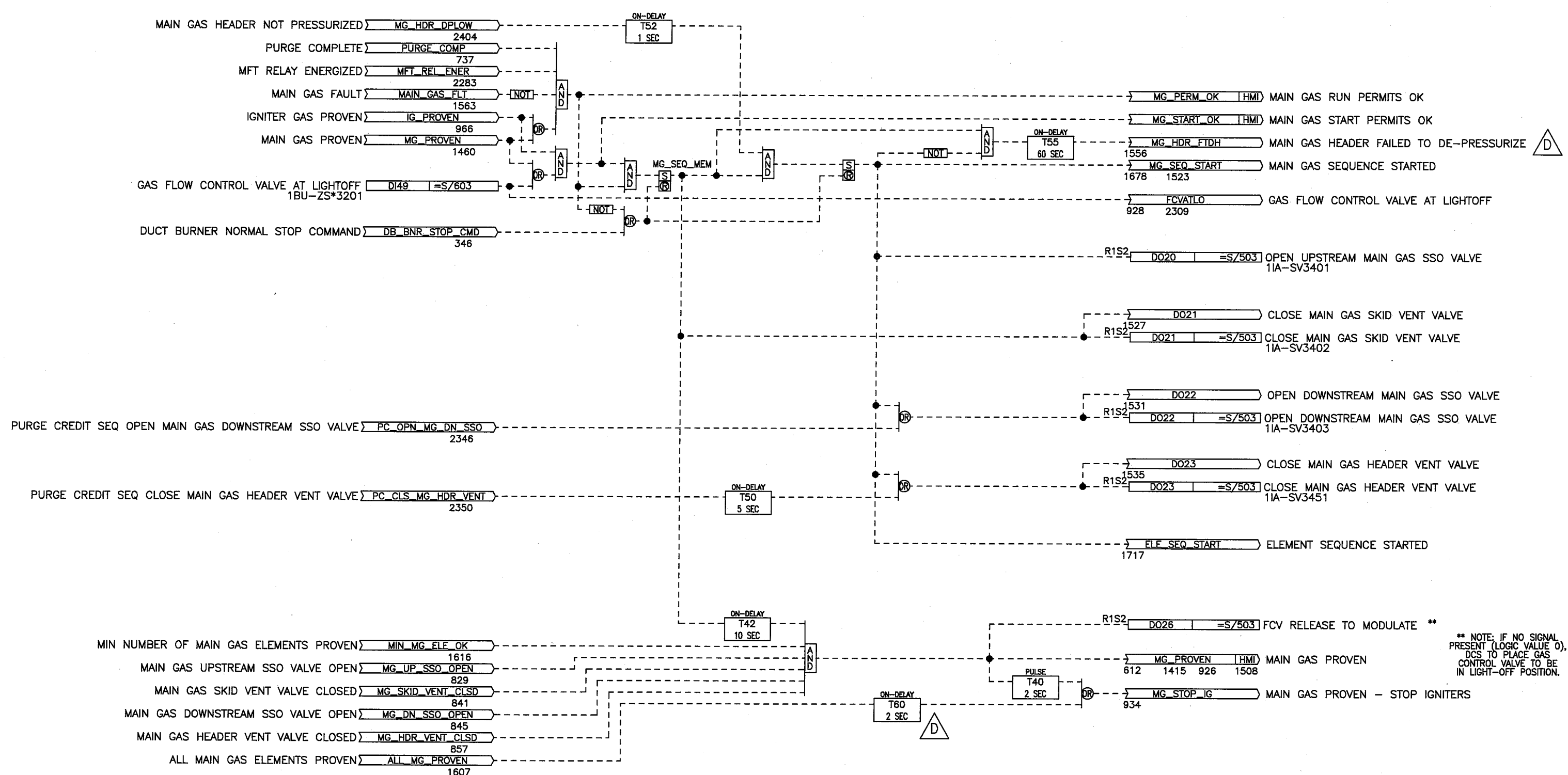
THE CHART IS THE REPRESENTATION
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TIMERS REQUIRED FOR EACH ELEMENT.
IN_XX IS NOTED AS THE INPUT
REQUIRED FOR THE FUNCTION BLOCK,
OUT_XX IS NOTED AS THE OUTPUT
OF THE FUNCTION BLOCK.
USE BMS I/O LIST
(B10238-073-01) AS A REFERENCE

POINT NAME	FUNCTION TEXT	EMNT 1	EMNT 2	EMNT 3	EMNT 4	EMNT 5	EMNT 6	EMNT 7
IN_01	ELEMENT #1 NO FLAME SCANNER FAULT	NO_ELO1_FLM_FLT	NO_ELO2_FLM_FLT	NO_ELO3_FLM_FLT	NO_ELO4_FLM_FLT	NO_ELO5_FLM_FLT	NO_ELO6_FLM_FLT	NO_ELO7_FLM_FLT
IN_02								
IN_03	IGNITER GAS SEQUENCE STARTED	IG_SEQ_START	IG_SEQ_START	IG_SEQ_START	IG_SEQ_START	IG_SEQ_START	IG_SEQ_START	IG_SEQ_START
IN_04	ELEMENT #1 IGNITER FAULT	E01_IGN_FLT	E02_IGN_FLT	E03_IGN_FLT	E04_IGN_FLT	E05_IGN_FLT	E06_IGN_FLT	E07_IGN_FLT
IN_05	ELEMENT #1 MAIN GAS PROVEN > 5 SEC	E01_MG_PROVEN_5	E02_MG_PROVEN_5	E03_MG_PROVEN_5	E04_MG_PROVEN_5	E05_MG_PROVEN_5	E06_MG_PROVEN_5	E07_MG_PROVEN_5
IN_06	ELEMENT #1 FLAME DETECTED	E01_FLM_DET	E02_FLM_DET	E03_FLM_DET	E04_FLM_DET	E05_FLM_DET	E06_FLM_DET	E07_FLM_DET
IN_07	ELEMENT #1 IGNITER GAS SO VALVE OPEN	DI179	DI187	DI195	DI203	DI211	DI219	DI227
IN_08	ELEMENT #1 IGNITER GAS SO VALVE CLOSED	DI180	DI188	DI196	DI204	DI212	DI220	DI228
IN_09	SYSTEM RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET
OUT_01	ELEMENT #1 IGNITER GAS SO VALVE CLOSED	E01_IG_SO_CLSD	E02_IG_SO_CLSD	E03_IG_SO_CLSD	E04_IG_SO_CLSD	E05_IG_SO_CLSD	E06_IG_SO_CLSD	E07_IG_SO_CLSD
OUT_02	OPEN ELEMENT #1 IGNITER GAS SO VALVE	DO169	DO170	DO171	DO172	DO173	DO174	DO175
OUT_03	ELEMENT #1 IGNITER GAS PROVEN	E01_IG_PROVEN	E02_IG_PROVEN	E03_IG_PROVEN	E04_IG_PROVEN	E05_IG_PROVEN	E06_IG_PROVEN	E07_IG_PROVEN
OUT_04	ELEMENT #1 IGNITER FAULT	E01_IGN_FLT	E02_IGN_FLT	E03_IGN_FLT	E04_IGN_FLT	E05_IGN_FLT	E06_IGN_FLT	E07_IGN_FLT
OUT_05	ELEMENT #1 IGNITER GAS SO VALVE FTO FIRST OUT	E01_IG_SO_FTO	E02_IG_SO_FTO	E03_IG_SO_FTO	E04_IG_SO_FTO	E05_IG_SO_FTO	E06_IG_SO_FTO	E07_IG_SO_FTO
OUT_06	ELEMENT #1 IGNITER GAS SO VALVE FTC FIRST OUT	E01_IG_SO_FTC	E02_IG_SO_FTC	E03_IG_SO_FTC	E04_IG_SO_FTC	E05_IG_SO_FTC	E06_IG_SO_FTC	E07_IG_SO_FTC
OUT_07	ELEMENT #1 IGNITER GAS SO VALVE FTO	E01_IG_SO_FTOH	E02_IG_SO_FTOH	E03_IG_SO_FTOH	E04_IG_SO_FTOH	E05_IG_SO_FTOH	E06_IG_SO_FTOH	E07_IG_SO_FTOH
OUT_08	ELEMENT #1 IGNITER GAS SO VALVE FTC	E01_IG_SO_FTCH	E02_IG_SO_FTCH	E03_IG_SO_FTCH	E04_IG_SO_FTCH	E05_IG_SO_FTCH	E06_IG_SO_FTCH	E07_IG_SO_FTCH

Element	Flame Detected	Scanner Fault Detected	Flame Scanner Fault Alarm
ELEMENT #1	1BU-SCN3585A_FD	1BU-SCN3585A_CF	1110 1227 1841 1739
ELEMENT #1	DI181 =S/903	DI182 =S/903	E01_FLM_DET
ELEMENT #1		NOT	NO_ELO1_FLM_FLT
ELEMENT #1			E01_SCNR_FLT
ELEMENT #2	1BU-SCN3585B_FD	1BU-SCN3585B_CF	
ELEMENT #2	DI189 =S/903	DI190 =S/903	E02_FLM_DET
ELEMENT #2		NOT	NO_ELO2_FLM_FLT
ELEMENT #2			E02_SCNR_FLT
ELEMENT #3	1BU-SCN3585C_FD	1BU-SCN3585C_CF	
ELEMENT #3	DI197 =S/1003	DI198 =S/1003	E03_FLM_DET
ELEMENT #3		NOT	NO_ELO3_FLM_FLT
ELEMENT #3			E03_SCNR_FLT
ELEMENT #4	1BU-SCN3585D_FD	1BU-SCN3585D_CF	
ELEMENT #4	DI205 =S/1003	DI206 =S/1003	E04_FLM_DET
ELEMENT #4		NOT	NO_ELO4_FLM_FLT
ELEMENT #4			E04_SCNR_FLT
ELEMENT #5	1BU-SCN3585E_FD	1BU-SCN3585E_CF	
ELEMENT #5	DI213 =S/1003	DI214 =S/1003	E05_FLM_DET
ELEMENT #5		NOT	NO_ELO5_FLM_FLT
ELEMENT #5			E05_SCNR_FLT
ELEMENT #6	1BU-SCN3585F_FD	1BU-SCN3585F_CF	
ELEMENT #6	DI221 =S/1003	DI222 =S/1003	E06_FLM_DET
ELEMENT #6		NOT	NO_ELO6_FLM_FLT
ELEMENT #6			E06_SCNR_FLT
ELEMENT #7	1BU-SCN3585G_FD	1BU-SCN3585G_CF	
ELEMENT #7	DI229 =S/1103	DI230 =S/1103	E07_FLM_DET
ELEMENT #7		NOT	NO_ELO7_FLM_FLT
ELEMENT #7			E07_SCNR_FLT

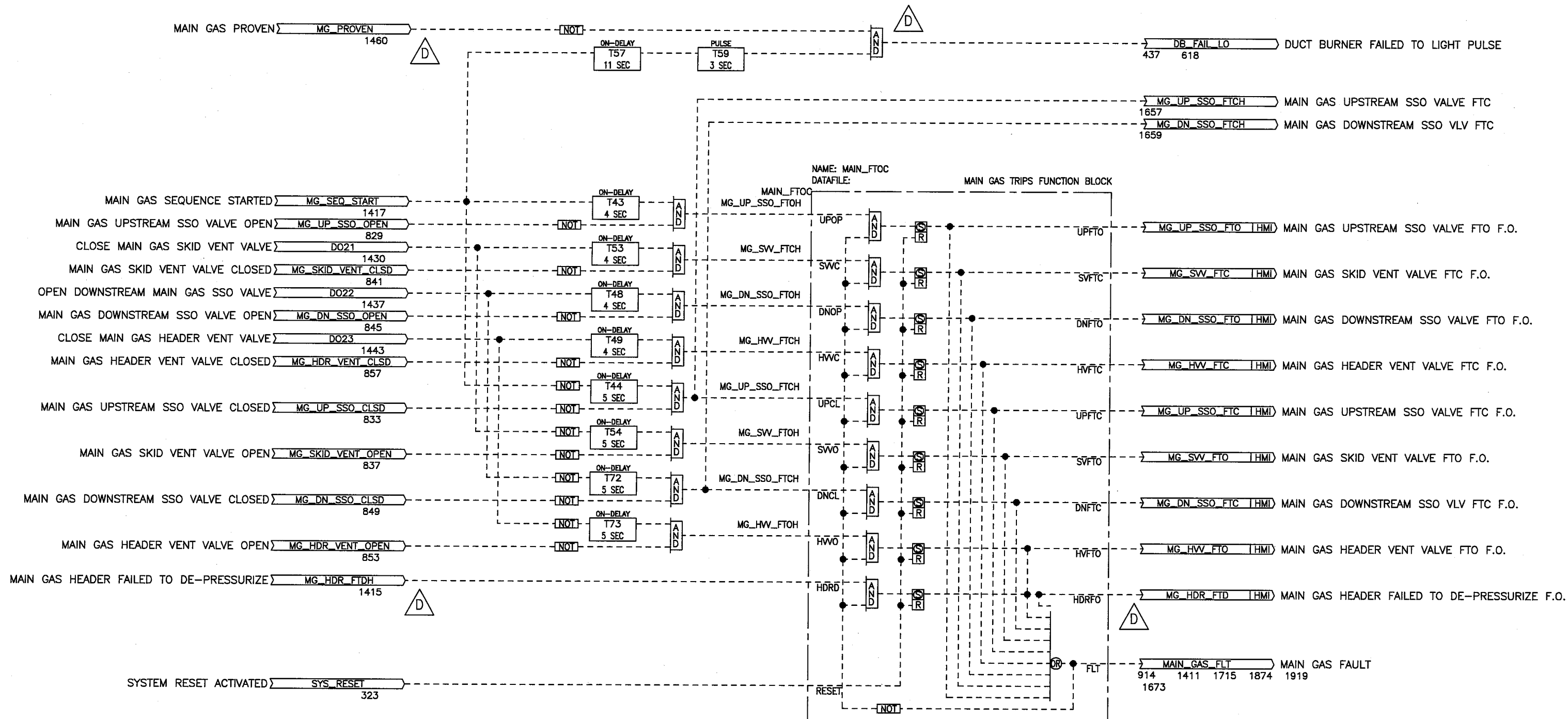
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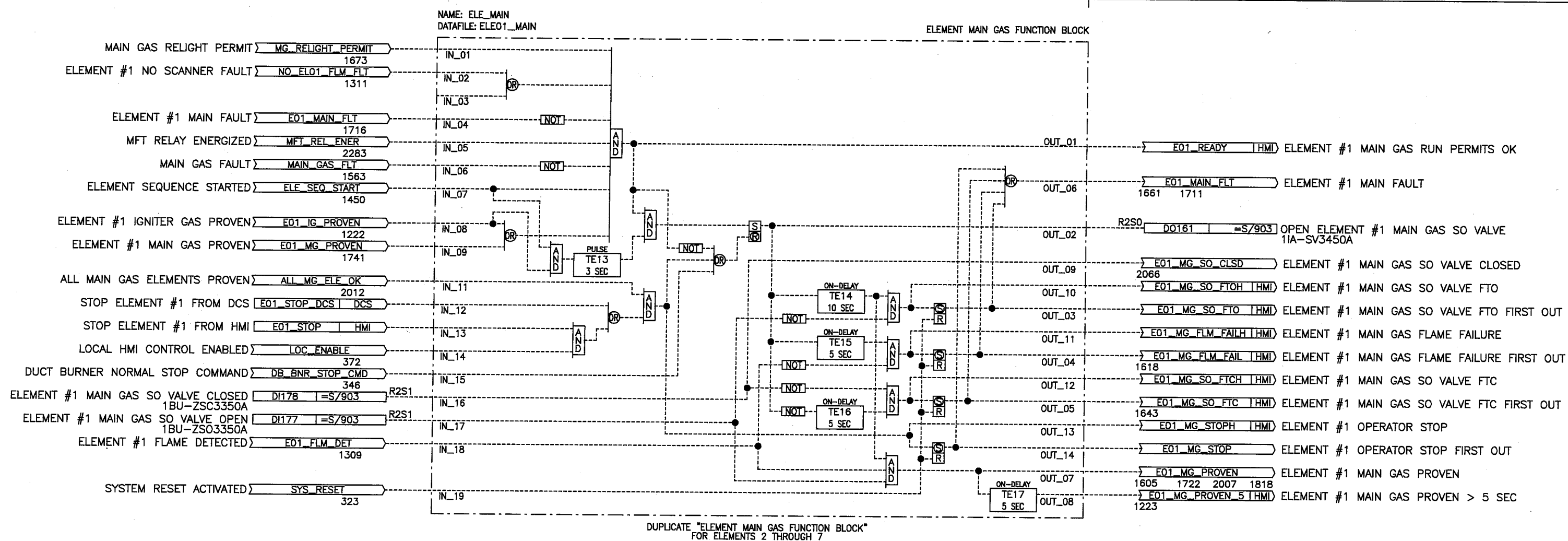
D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM MAIN GAS - 1	CONTRACT B10238	SCALE NONE	SIZE 14	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL							
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A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.						
REV	DATE	DR	ENG	RVND	DESCRIPTION							

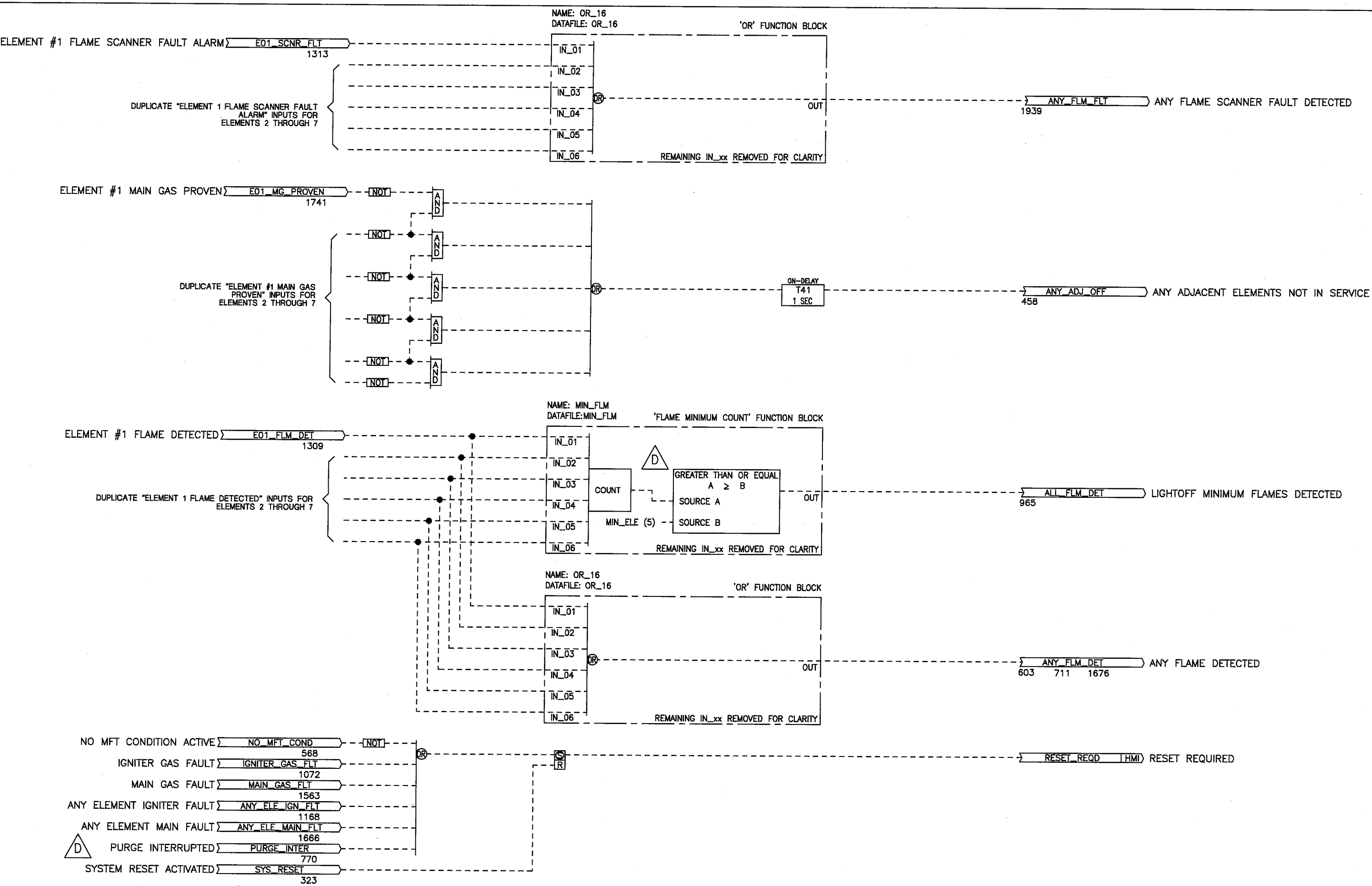
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OUT_XX IS NOTED AS THE OUTPUT
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USE BMS I/O LIST
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POINT NAME	FUNCTION TEXT	EMNT 1	EMNT 2	EMNT 3	EMNT 4	EMNT 5	EMNT 6	EMNT 7
IN_01	MAIN GAS RELIGHT PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT	MG_RELIGHT_PERMIT
IN_02	ELEMENT # NO FLAME SCANNER FAULT	NO_ELO1_FLM_FLT	NO_ELO2_FLM_FLT	NO_ELO3_FLM_FLT	NO_ELO4_FLM_FLT	NO_ELO5_FLM_FLT	NO_ELO6_FLM_FLT	NO_ELO7_FLM_FLT
IN_03								
IN_04	ELEMENT # MAIN FAULT	E01_MAIN_FLT	E02_MAIN_FLT	E03_MAIN_FLT	E04_MAIN_FLT	E05_MAIN_FLT	E06_MAIN_FLT	E07_MAIN_FLT
IN_05	MFT RELAY ENERGIZED	MFT_REL_ENER	MFT_REL_ENER	MFT_REL_ENER	MFT_REL_ENER	MFT_REL_ENER	MFT_REL_ENER	MFT_REL_ENER
IN_06	MAIN GAS FAULT	MAIN_GAS_FLT	MAIN_GAS_FLT	MAIN_GAS_FLT	MAIN_GAS_FLT	MAIN_GAS_FLT	MAIN_GAS_FLT	MAIN_GAS_FLT
IN_07	ELEMENT SEQUENCE STARTED	ELE_SEQ_START	ELE_SEQ_START	ELE_SEQ_START	ELE_SEQ_START	ELE_SEQ_START	ELE_SEQ_START	ELE_SEQ_START
IN_08	ELEMENT # IGNITER GAS PROVEN	E01_IG_PROVEN	E02_IG_PROVEN	E03_IG_PROVEN	E04_IG_PROVEN	E05_IG_PROVEN	E06_IG_PROVEN	E07_IG_PROVEN
IN_09	ELEMENT # MAIN GAS PROVEN	E01_MG_PROVEN	E02_MG_PROVEN	E03_MG_PROVEN	E04_MG_PROVEN	E05_MG_PROVEN	E06_MG_PROVEN	E07_MG_PROVEN
IN_10								
IN_11	ALL MAIN GAS ELEMENTS PROVEN	ALL_MG_ELE_OK	ALL_MG_ELE_OK	ALL_MG_ELE_OK	ALL_MG_ELE_OK	ALL_MG_ELE_OK	ALL_MG_ELE_OK	ALL_MG_ELE_OK
IN_12	STOP ELEMENT # FROM DCS	E01_STOP_DCS	E02_STOP_DCS	E03_STOP_DCS	E04_STOP_DCS	E05_STOP_DCS	E06_STOP_DCS	E07_STOP_DCS
IN_13	STOP ELEMENT # FROM HMI	E01_STOP	E02_STOP	E03_STOP	E04_STOP	E05_STOP	E06_STOP	E07_STOP
IN_14	LOCAL ENABLED	LOC_ENABLE	LOC_ENABLE	LOC_ENABLE	LOC_ENABLE	LOC_ENABLE	LOC_ENABLE	LOC_ENABLE
IN_15	DUCT BURNER STOP COMMAND	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD	DB_BNR_STOP_CMD
IN_16	ELEMENT # MAIN GAS SO VALVE CLOSED	DI178	DI186	DI194	DI202	DI210	DI218	DI226
IN_17	ELEMENT # MAIN GAS SO VALVE OPEN	DI177	DI185	DI193	DI201	DI209	DI217	DI225
IN_18	ELEMENT # FLAME DETECTED	E01_FLM_DET	E02_FLM_DET	E03_FLM_DET	E04_FLM_DET	E05_FLM_DET	E06_FLM_DET	E07_FLM_DET
IN_19	SYSTEM RESET ACTIVATED	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET	SYS_RESET
OUT_01	ELEMENT # MAIN GAS RUN PERMITS OK	E01_READY	E02_READY	E03_READY	E04_READY	E05_READY	E06_READY	E07_READY
OUT_02	OPEN ELEMENT # MAIN GAS SO VALVE	DO161	DO162	DO163	DO164	DO165	DO166	DO167
OUT_03	ELEMENT # MAIN GAS SO VALVE FTO FIRST OUT	E01_MG_SO_FTO	E02_MG_SO_FTO	E03_MG_SO_FTO	E04_MG_SO_FTO	E05_MG_SO_FTO	E06_MG_SO_FTO	E07_MG_SO_FTO
OUT_04	ELEMENT # MAIN GAS FLAME FAILURE FIRST OUT	E01_MG_FLM_FAIL	E02_MG_FLM_FAIL	E03_MG_FLM_FAIL	E04_MG_FLM_FAIL	E05_MG_FLM_FAIL	E06_MG_FLM_FAIL	E07_MG_FLM_FAIL
OUT_05	ELEMENT # MAIN GAS SO VALVE FTC FIRST OUT	E01_MG_SO_FTC	E02_MG_SO_FTC	E03_MG_SO_FTC	E04_MG_SO_FTC	E05_MG_SO_FTC	E06_MG_SO_FTC	E07_MG_SO_FTC
OUT_06	ELEMENT # MAIN FAULT	E01_MAIN_FLT	E02_MAIN_FLT	E03_MAIN_FLT	E04_MAIN_FLT	E05_MAIN_FLT	E06_MAIN_FLT	E07_MAIN_FLT
OUT_07	ELEMENT # MAIN GAS PROVEN	E01_MG_PROVEN	E02_MG_PROVEN	E03_MG_PROVEN	E04_MG_PROVEN	E05_MG_PROVEN	E06_MG_PROVEN	E07_MG_PROVEN
OUT_08	ELEMENT # MAIN GAS PROVEN > 5 SEC	E01_MG_PROVEN_5	E02_MG_PROVEN_5	E03_MG_PROVEN_5	E04_MG_PROVEN_5	E05_MG_PROVEN_5	E06_MG_PROVEN_5	E07_MG_PROVEN_5
OUT_09	ELEMENT # MAIN GAS SO VALVE CLOSED	E01_MG_SO_CLSD	E02_MG_SO_CLSD	E03_MG_SO_CLSD	E04_MG_SO_CLSD	E05_MG_SO_CLSD	E06_MG_SO_CLSD	E07_MG_SO_CLSD
OUT_10	ELEMENT # MAIN GAS SO VALVE FTO	E01_MG_SO_FTOH	E02_MG_SO_FTOH	E03_MG_SO_FTOH	E04_MG_SO_FTOH	E05_MG_SO_FTOH	E06_MG_SO_FTOH	E07_MG_SO_FTOH
OUT_11	ELEMENT # MAIN GAS FLAME FAILURE	E01_MG_FLM_FAILH	E02_MG_FLM_FAILH	E03_MG_FLM_FAILH	E04_MG_FLM_FAILH	E05_MG_FLM_FAILH	E06_MG_FLM_FAILH	E07_MG_FLM_FAILH
OUT_12	ELEMENT # MAIN GAS SO VALVE FTC	E01_MG_SO_FTC	E02_MG_SO_FTC	E03_MG_SO_FTC	E04_MG_SO_FTC	E05_MG_SO_FTC	E06_MG_SO_FTC	E07_MG_SO_FTC
OUT_13	ELEMENT # OPERATOR STOP	E01_MG_STOPH	E02_MG_STOPH	E03_MG_STOPH	E04_MG_STOPH	E05_MG_STOPH	E06_MG_STOPH	E07_MG_STOPH
OUT_14	ELEMENT # OPERATOR STOP FIRST OUT	E01_MG_STOP	E02_MG_STOP	E03_MG_STOP	E04_MG_STOP	E05_MG_STOP	E06_MG_STOP	E07_MG_STOP

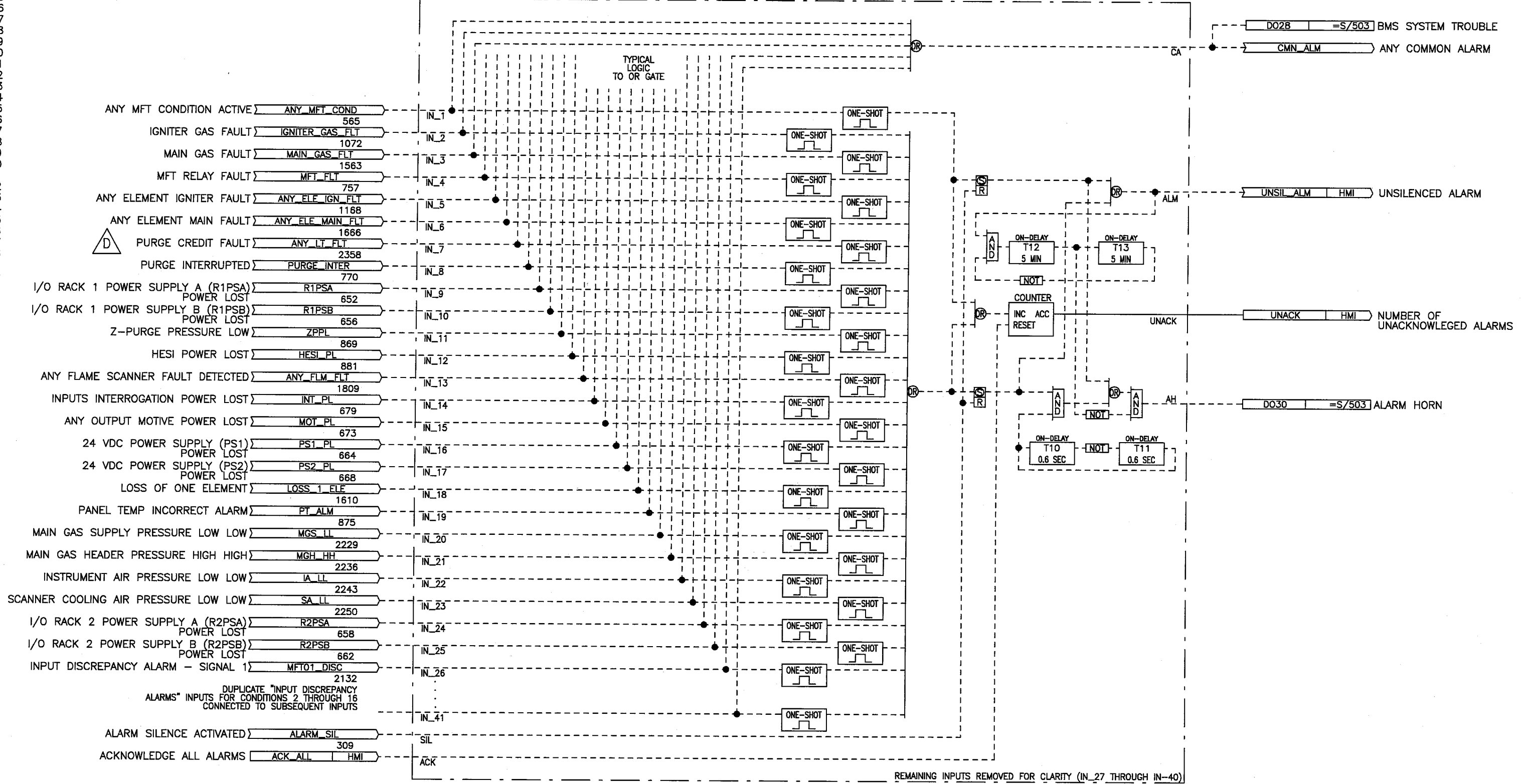
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NAME: ALM_BLK
DATAFILE: ALM_BLK

COMMON ALARM/HORN FUNCTION BLOCK



D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT	SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.	MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM ALARMS	CONTRACT B10238	SCALE NONE	SIZE 19	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL	THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.						
REV	DATE	DR	ENG	RWD	DESCRIPTION							

NAME: AND_16
DATAFILE: AND_16

'AND' FUNCTION BLOCK

ELEMENT #1 MAIN GAS PROVEN → E01_MG_PROVEN 1741

DUPLICATE "ELEMENT 1 MAIN GAS PROVEN" INPUTS FOR ELEMENTS 2 THROUGH 7

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ALL_MG_ELE_OK 1725 → ALL MAIN GAS ELEMENTS PROVEN

REMAINING IN_xx REMOVED FOR CLARITY

NAME: AND_32
DATAFILE: AND_32 'AND' FUNCTION BLOCK

ELEMENT #1 IGNITER GAS SO VALVE CLOSED > E01_IG_SO_CLSD 1216

DUPLICATE "ELEMENT 1 IGNITER GAS SO VALVE CLOSED" INPUTS FOR ELEMENTS 2 THROUGH 7

ALL ELEMENTS MAIN GAS SO VALVES CLOSED > ALL_ELE_SO_VLV_CLSD 2071

IGNITER GAS UPSTREAM SSO VALVE CLOSED > IG_UP_SSO_CLSD 809

IGNITER GAS DOWNSTREAM SSO VALVE CLOSED > IG_DN_SSO_CLSD 825

MAIN GAS UPSTREAM SSO VALVE CLOSED > MG_UP_SSO_CLSD 833

MAIN GAS DOWNSTREAM SSO VALVE CLOSED > MG_DN_SSO_CLSD 849

AND

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ALL_FUEL_VLVS_CLSD 721 2307 ALL FUEL VALVES CLOSED

REMAINING IN_xx REMOVED FOR CLARITY

NAME: AND_16
DATAFILE: AND_16 'AND' FUNCTION BLOCK

ELEMENT #1 MAIN GAS SO VALVE CLOSED E01_MG_SO_CLSD 1723

DUPLICATE "ELEMENT 1 MAIN GAS SO VALVE CLOSED" INPUTS FOR ELEMENTS 2 THROUGH 7


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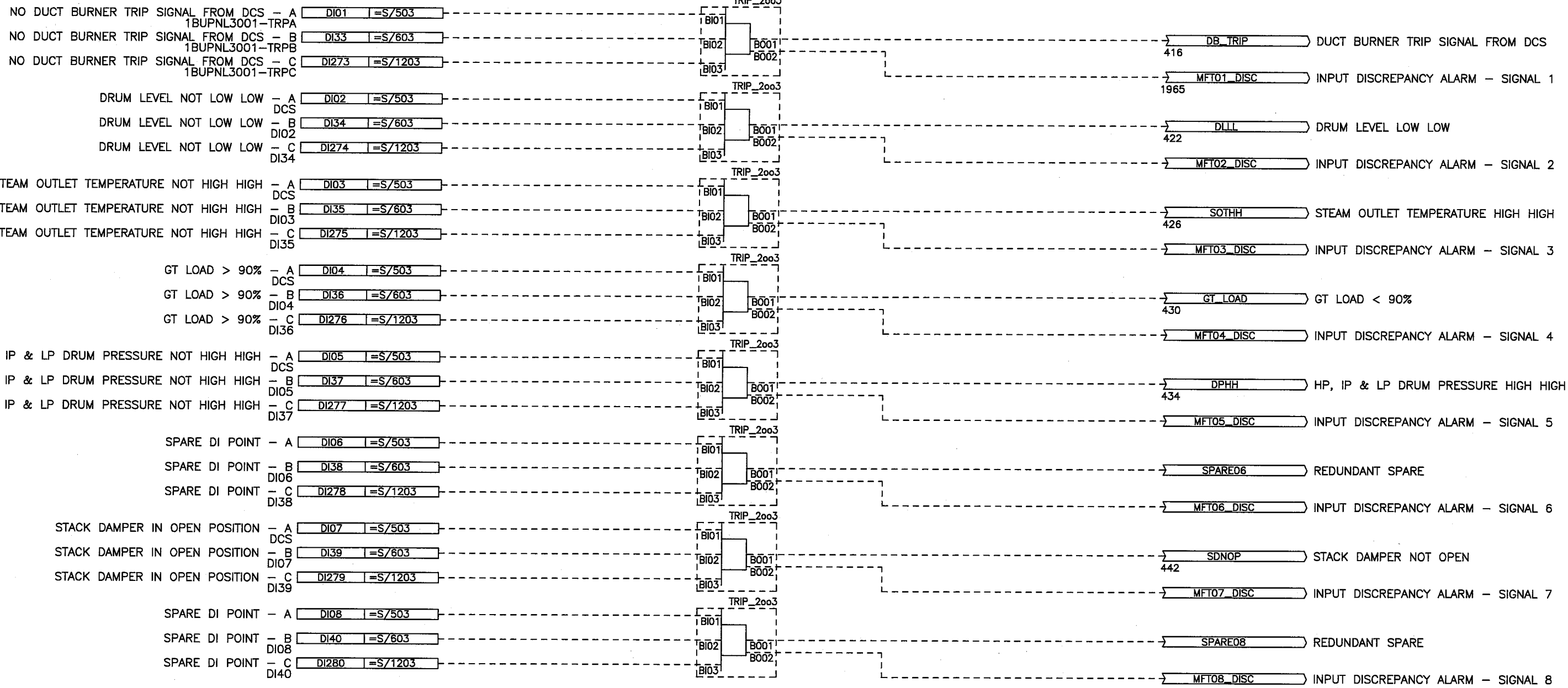
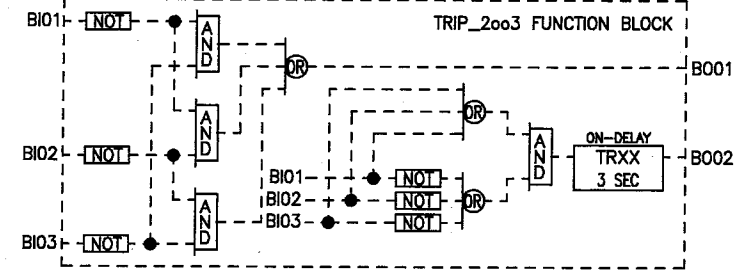
ALL ELE SO VLV_CLSD 626 2042 ALL ELEMENTS MAIN GAS SO VALVES CLOSED

REMAINING IN_xx REMOVED FOR CLARITY

2000						SEE FORNEY CORPORATION STANDARD 348384-01 FOR TOLERANCES. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF FORNEY CORPORATION. ALL INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND SHALL NOT BE REPRODUCED, COPIED, LENT, OR DISCLOSED WITHOUT THE WRITTEN PERMISSION OF FORNEY CORPORATION.	TITLE MIDDLETOWN / KINGS MOUNTAIN DUCT BURNER BMS LOGIC DIAGRAM MISCELLANEOUS	 Forney Corporation				
D	5/17/16	JH	CJ	BKE	REVISED PER AS BUILT			CONTRACT B10238	SCALE NONE SHT 20 OF 24	SIZE B	DRAWING NUMBER B10238-071-01	REV D
A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL							
REV	DATE	DR	ENG	RWVD	DESCRIPTION							

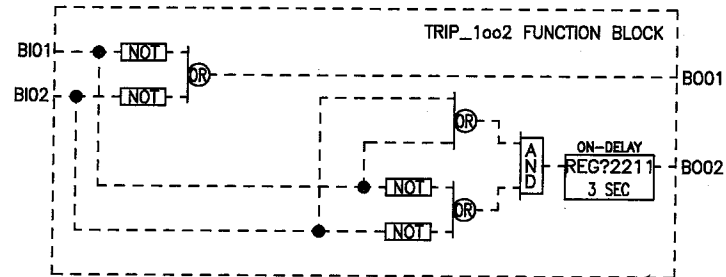
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TYPICAL DISCREPANCY ALM CIRCUITRY FOR ALL PROVIDED MFT TRIP SIGNALS (SEE BELOW)

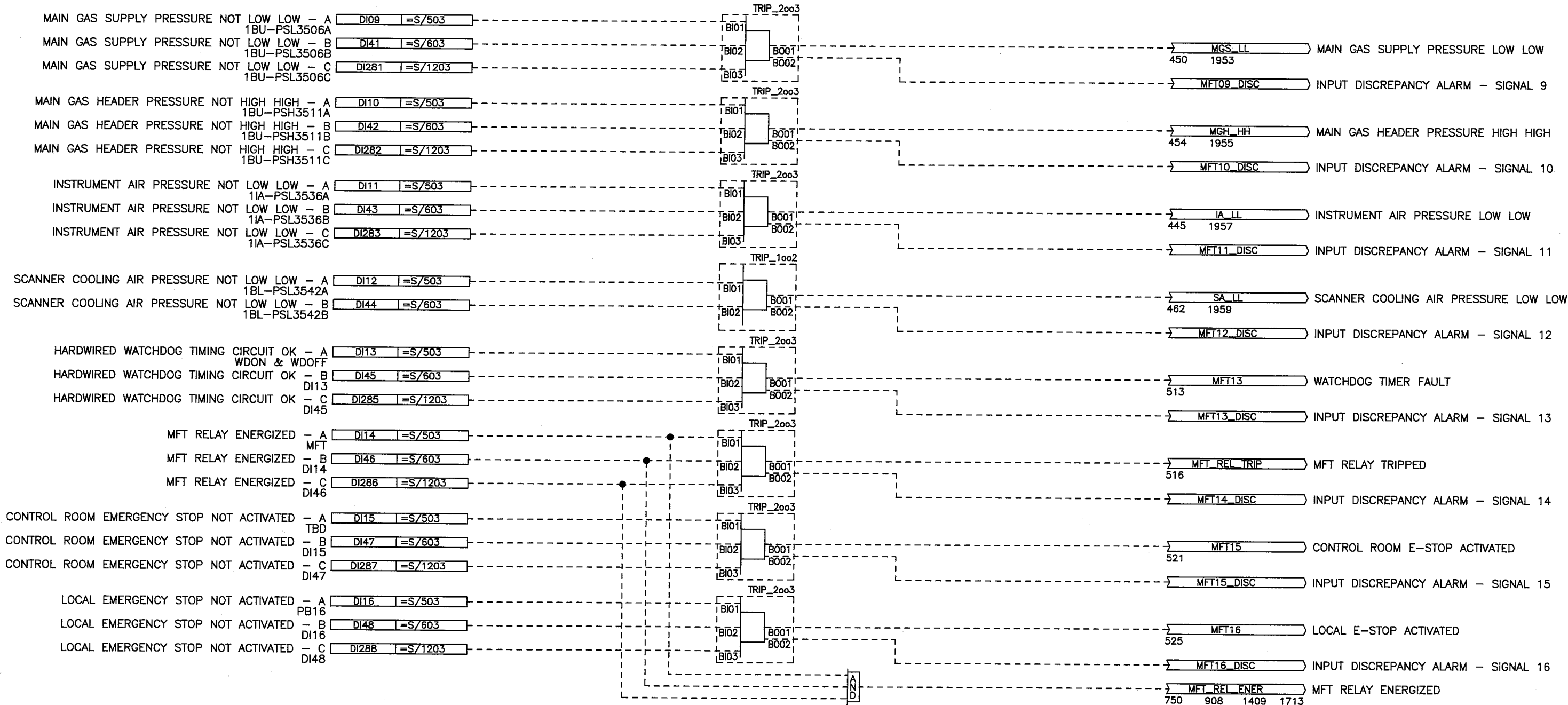
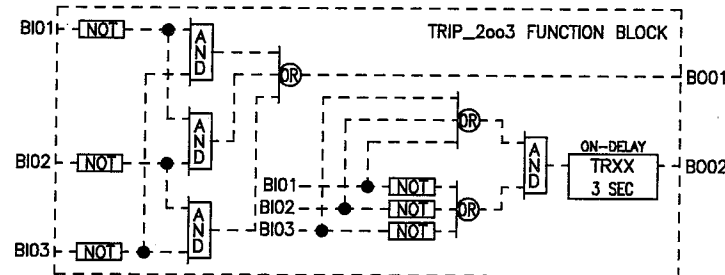


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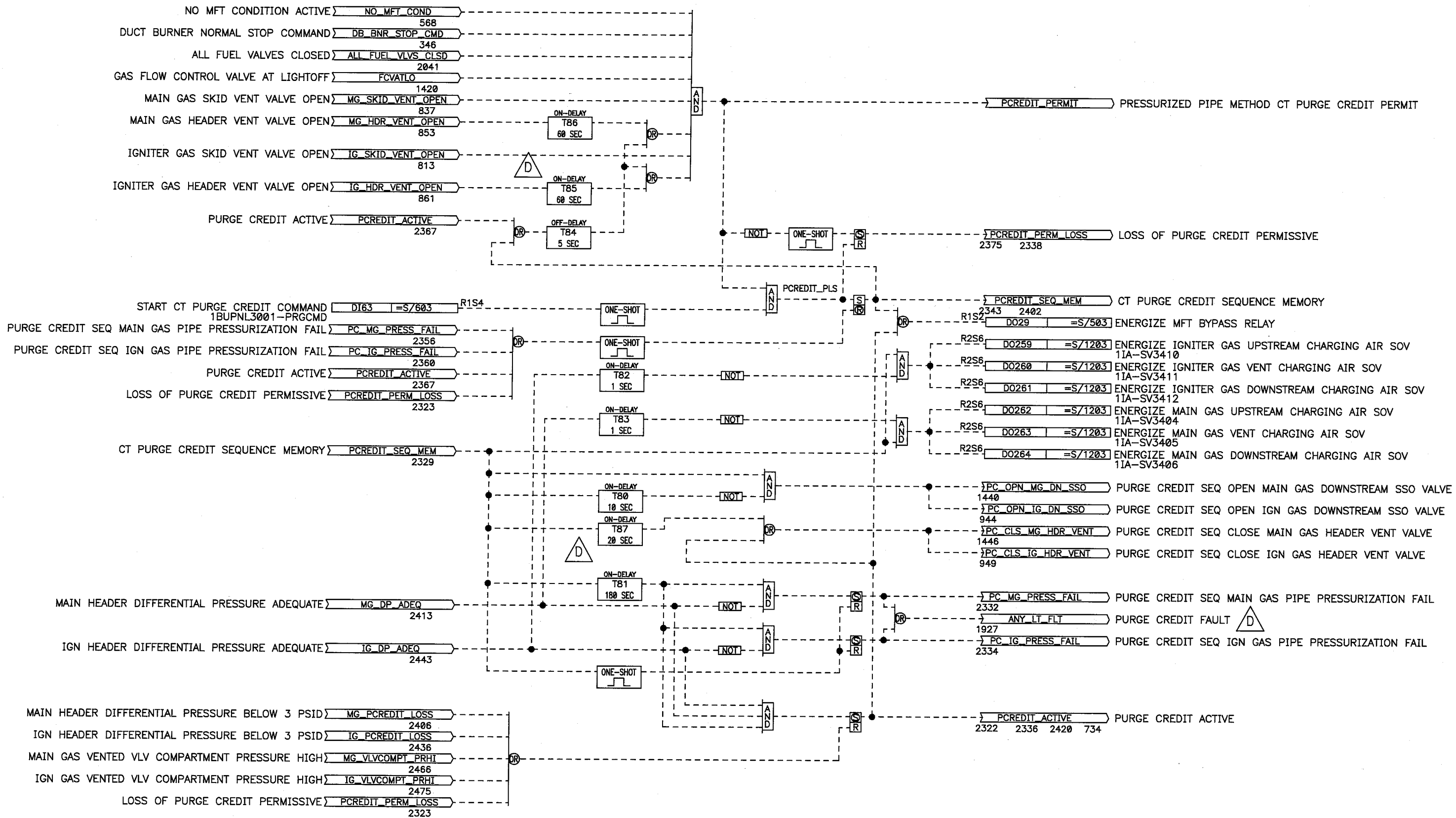
TYPICAL DISAGREEMENT ALARM CIRCUITRY FOR ALL PROVIDED REDUNDANT MFT TRIP SIGNALS (SEE BELOW)



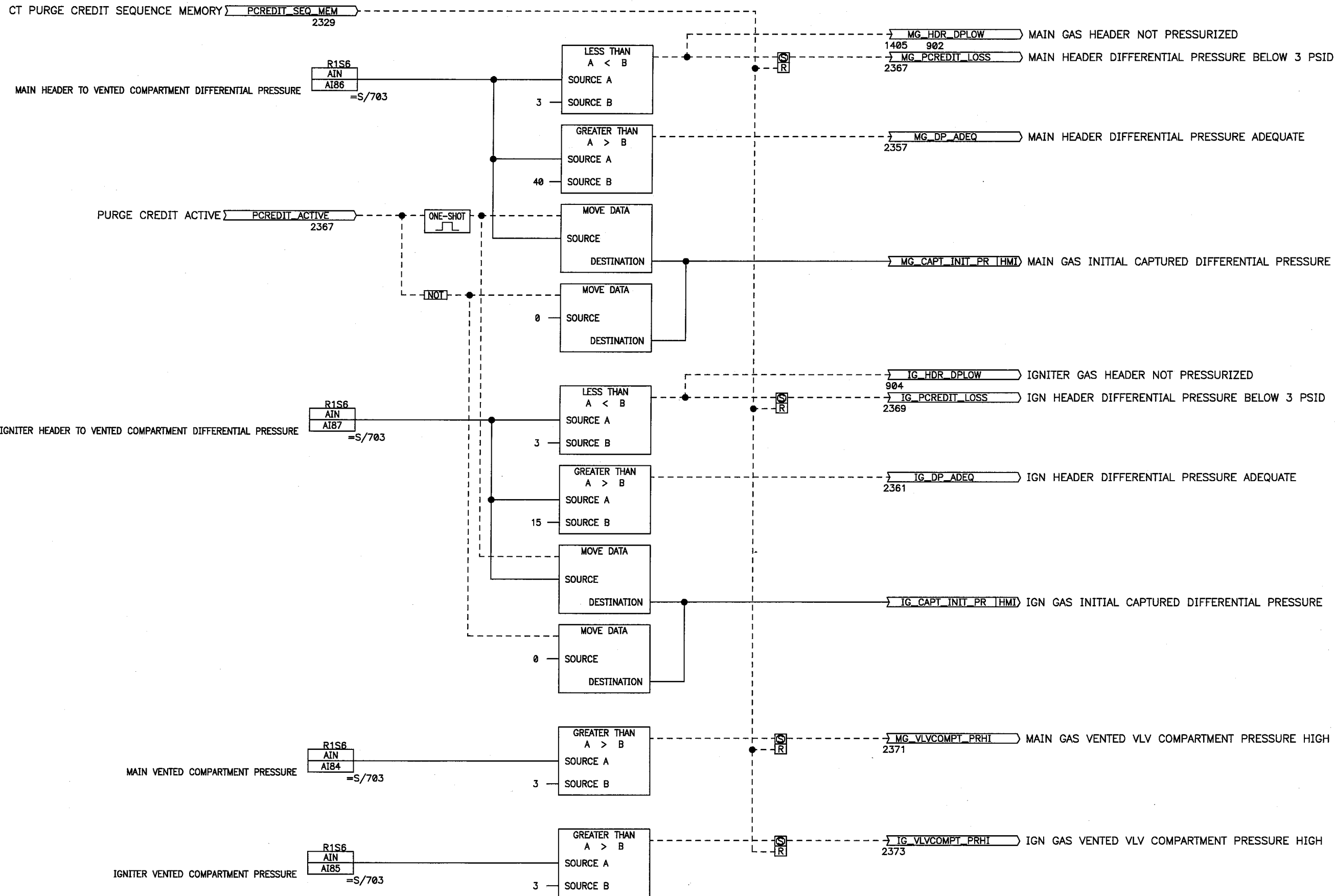
TYPICAL DISCREPANCY ALM CIRCUITRY FOR ALL PROVIDED MFT TRIP SIGNALS (SEE BELOW)



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A	11/25/15	JH	CJ	CGS	FIRST SUBMITTAL
REV	DATE	DR	ENG	RWD	DESCRIPTION

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TITLE MIDDLETOWN / KINGS MOUNTAIN
DUCT BURNER
BMS LOGIC DIAGRAM
PURGE CREDIT - 2

CONTRACT		SCALE		SIZE		DRAWING NUMBER		REV	
B10238		NONE		B		B10238-071-01		D	
SHT		24		OF		24			

