

# Sign Table Cheat Sheet

## T1200015-v4

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For aLIGO production electronics

- All DAMP Gains should be negative ( - )
- All OSEMINF Gains should be positive ( + )
- All SENSE and DRIVE ALIGN Elements should be ( + ) (for starters at least)
- OSEM2EUL is the transpose of EUL2OSEM
- Therefore, the only gains that need defining are the EUL2OSEM and COILOUTF gains
- All 4 OSEM Stages on SUSs have the same OSEM magnet polarity arrangement, so these are only defined once: UL = S, LL = N, UR = N, LR = S
- The TOP stages for each SUS type vary in OSEM arrangement and magnet polarity so they are called out explicitly
- For BOSEMs, N polarity is compensated by +1, S polarity is compensated by -1 in COILOUTF gain
- AOSEM and BOSEM coils are wound exactly opposite in direction, resulting in the following current-sign-to-force relationship:

AOSEMs		
Coil Current	Magnet Polarity	Force
+	N	Pull
-	N	Push
+	S	Push
-	S	Pull

BOSEMs		
Coil Current	Magnet Polarity	Force
+	N	Push
-	N	Pull
+	S	Pull
-	S	Push

### AOSEM 4 OSEM Stage

EUL2OSEM				COILOUTF Gain	
	L	P	Y		
UL	+	+	-	UL	+
LL	+	-	-	LL	-
UR	+	+	+	UR	-
LR	+	-	+	LR	+

### BOSEM 4 OSEM Stage

EUL2OSEM				COILOUTF Gain	
	L	P	Y		
UL	+	+	-	UL	-
LL	+	-	-	LL	+
UR	+	+	+	UR	+
LR	+	-	+	LR	-

### QUAD M0

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
F1					-		F1	+
F2	-				+	+	F2	-
F3	-				+	-	F3	+
LF			-	-			LF	-
RT			-	+			RT	+
SD		-					SD	-

### QUAD R0

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
F1					+		F1	+
F2	+				-	-	F2	+
F3	+				-	+	F3	-
LF			-	-			LF	+
RT			-	+			RT	-
SD		+					SD	-

### BSFM M1

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
F1					+		F1	+
F2	+				-	-	F2	+
F3	+				-	+	F3	-
LF			-	-			LF	+
RT			-	+			RT	-
SD		-					SD	-

### HXTS & OMCS M1

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
T1			-	-			T1	-
T2			-	+	+		T2	-
T3			-	+	-		T3	+
LF	+					-	LF	+
RT	+					+	RT	-
SD		-					SD	-

### RIGHT-HANDED TMTS M1

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
F1				+			F1	+
F2		-		-		+	F2	-
F3		-		-		-	F3	+
LF			-		-		LF	-
RT			-		+		RT	+
SD	+						SD	-

### LEFT-HANDED TMTS M1

EUL2OSEM							COILOUTF Gain	
	L	T	V	R	P	Y		
F1				-			F1	+
F2		+		+		+	F2	-
F3		+		+		-	F3	+
LF			-		+		LF	-
RT			-		-		RT	+
SD	-						SD	-