BERMUDA ELECTRIC LIGHT COMPANY LIMITED

UTILITY-REQUIRED PROFILE

VERSION 1.0

Utility-Required Profile (URP) Parameter Settings

Parameter Type	1547-2018 Parameter Label	Required Value	Units
	NP_NORMAL_OP_CAT	CAT_B	Text
	NP_ABNORMAL_OP_CAT	CAT_III	Text
Permit Service Mode Select	ES_PERMIT_SERVICE	ENABLED	Text
Enter Service Voltage	ES_V_LOW	0.88	V p.u.
	ES_V_HIGH	1.05	V p.u.
Enter Service Frequency	ES_F_LOW	59.50	Hz
	ES_F_HIGH	60.10	Hz
Soft-Start Ramp	ES_RANDOMIZED_DELAY	0	Text
	ES_DELAY	600	s
	ES_RAMP_RATE	600	s
Constant Power Factor Mode Select	CONST_PF_MODE_ENABLE	DISABLED	Text
Constant Power Factor Excitation	CONST_PF_EXCITATION	ABS	Text
Constant Power Factor	CONST_PF	-0.90	VAr p.u
Constant Q Mode Select	CONST_Q_MODE_ENABLE	DISABLED	Text
Constant Q	CONST_Q_MODE_EXCITATION	INJ	Text
	CONST_Q	0.9	VAr p.u.
Q(V) Mode Select	QV_MODE_ENABLE	ENABLED	Text
Q(V) Fixed Vref	QV_VREF	1.0	V p.u.
Q(V) Fixed Vref Mode Select	QV_VREF_AUTO_MODE	DISABLED	Text
Q(V) Auto Vref Avg Time	QV_VREF_OLRT	300	s

Parameter Type	1547-2018 Parameter Label	Required Value	Units
Q(V) Curve Point V2	QV_CURVE_V2	0.98	V p.u.
Q(V) Curve Point Q2	QV_CURVE_Q2	0% of NP_Q_MAX_INJ	VAr p.u.
Q(V) Curve Point V3	QV_CURVE_V3	1	V p.u.
Q(V) Curve Point Q3	QV_CURVE_Q3	0% of NP_Q_MAX_ABS	VAr p.u.
Q(V) Curve Point V1	QV_CURVE_V1	0.92	V p.u.
Q(V) Curve Point Q1	QV_CURVE_Q1	NP_Q_MAX_INJ	VAr p.u.
Q(V) Curve Point V4	QV_CURVE_V4	1.06	V p.u.
Q(V) Curve Point Q4	QV_CURVE_Q4	NP_Q_MAX_ABS	VAr p.u.
Q(V) OLRT	QV_OLRT	5	s
Q(P) Mode Enable	QP_MODE_ENABLE	DISABLED	Text
Q(P) Curve Point P3 (Gen)	QP_CURVE_P3_GEN	NP_P_MAX (Name Plate Real Power Max)	P p.u.
Q(P) Curve Point P2 (Gen)	QP_CURVE_P2_GEN	50% of NP_P_MAX	P p.u.
Q(P) Curve Point P1 (gen)	QP_CURVE_P1_GEN	GREATER OF 20% NP_P_MAX and P_MIN	P p.u.
Q(P) Curve Point P'1 (load)	QP_CURVE_P1_LOAD	70% of NP_P_MAX_CHARGE	P p.u.
Q(P) Curve Point P'2 (load)	QP_CURVE_P2_LOAD	80% of NP_P_MAX_CHARGE	P p.u.
Q(P) Curve Point P'3 (load)	QP_CURVE_P3_LOAD	100% of NP_P_MAX_CHARGE	P p.u.
Q(P) Curve Point Q3 (gen)	QP_CURVE_Q3_GEN	100% of NP_Q_MAX_ABS	VAr p.u.
Q(P) Curve Point Q2 (gen)	QP_CURVE_Q2_GEN	100% of NP_Q_MAX_ABS	VAr p.u.
Q(P) Curve Point Q1 (gen)	QP_CURVE_Q1_GEN	100% of NP_Q_MAX_ABS	VAr p.u.
Q(P) Curve Point Q'1 (load)	QP_CURVE_Q1_LOAD	100% of NP_Q_MAX_ABS	VAr p.u.
Q(P) Curve Point Q'2 (load)	QP_CURVE_Q2_LOAD	100% of NP_Q_MAX_ABS	VAr p.u.
Q(P) Curve Point Q'3 (load)	QP_CURVE_Q3_LOAD	100% of NP_Q_MAX_ABS	VAr p.u.
P(V) Mode Enable	PV_MODE_ENABLE	ENABLED	Text
P(V) Curve Point V1	PV_CURVE_V1	1.06	V p.u.
P(V) Curve Point P1	PV_CURVE_P1	100% of NP_P_MAX	P p.u.
P(V) Curve Point V2	PV_CURVE_V2	1.10	V p.u.
P(V) Curve Point P2 (gen)	PV_CURVE_P2_GEN	P_MIN	P p.u.
P(V) Curve Point P'2 (load)	PV_CURVE_P2_LOAD	0	P p.u.

Parameter Type	1547-2018 Parameter Label	Required Value	Units
P(V) OLRT	PV_OLRT	5	s
OV2	OV2_TRIP_V	1.2	V p.u.
	OV2_TRIP_T	0.16	s
OV1	OV1_TRIP_V	1.1	V p.u.
	OV1_TRIP_T	13	s
UV1	UV1_TRIP_V	0.88	V p.u.
	UV1_TRIP_T	50	s
UV2	UV2_TRIP_V	0.1	V p.u.
	UV2_TRIP_T	21	s
OF2	OF2_TRIP_F	65	Hz
	OF2_TRIP_T	0.16	s
OF1	OF1_TRIP_F	63	Hz
	OF1_TRIP_T	180	s
UF1	UF1_TRIP_F	57	Hz
	UF1_TRIP_T	180	s
UF2	UF2_TRIP_F	50	Hz
	UF2_TRIP_T	0.16	s
P(f)Deadband	PF_DBOF	0.036	Hz
	PF_DBUF	0.036	Hz
P(f) Droop Coefficient	PF_KOF	0.04	unitless
	PF_KUF	0.04	unitless
P(f) Open Loop Response Time	PF_OLRT	0.5	s
UI Mode Select	UI_MODE_ENABLE	ENABLED	Text

Utility-Required Profile Parameter Descriptions

1547-2018 Parameter Label	Description
NP_Q_MAX_ABS	Name Plate Reactive Power Maximum Absorbed
NP_Q_MAX_INJ	Name Plate Reactive Power Maximum Injected
NP_P_MAX	Name Plate Real Power Maximum
NP_NORMAL_OP_CAT	Normal performance capability (Category A/B described in 1.4). If multiple categories are supported, separate with underscores. Cat A_Cat B
NP_ABNORMAL_OP_CAT	Abnormal performance Category (I_ II_ or III described in 1.4). Where multiple categories are supported, separate with underscores. Cat I_Cat II_Cat III
ES_PERMIT_SERVICE	This function is activated by request from the Area EPS Operator
ES_V_LOW	Per unit value based on NP AC Vnom. Voltage shall be equal to or greater than default value
ES_V_HIGH	Per unit value based on NP AC Vnom. Voltage shall be equal to or less than default value
ES_F_LOW	Frequency shall be equal to or greater than default value. Frequency values shall be reported to 3 decimal places
ES_F_HIGH	Frequency shall be equal to or less than default value. Frequency values shall be reported to 3 decimal places.
ES_RANDOMIZED_DELAY	Enter Service Randomized Delay is an optional feature in IEEE Std 1547-2018. When enabled, the delay is a random value between 1 and 1000 seconds
ES_DELAY	Minimum Intentional delay before initiating Soft-Start
ES_RAMP_RATE	Enter Service Soft-Start duration. Time from zero to 100% Prated
CONST_PF_MODE_ENABLE	Constant Power Factor Mode Select
CONST_PF_EXCITATION	Under or Over Excited
CONST_PF	Per unit based on NP Qmax Abs. Negative signs indicate absorbing VAr

1547-2018 Parameter Label	Description
CONST_Q_MODE_ENABLE	Constant Reactive Power Mode Select
CONST_Q_MODE_EXCITATION	Under or Over Excited. This does not exist in 1547 but is needed
CONST_Q	Negative signs indicate absorbing VAr.
CONST_Q	Enable_ Disable (0_ 1) Specifed by AEPSO
QV_VREF	Per unit value based on NP AC Vnom. (Voltage bSSe).
QV_VREF_AUTO_MODE	Enable_ Disable (0_ 1) Specifed by AEPSO
QV_VREF_OLRT	Vref time constant in seconds SS specified by the Area EPS Operator
QV_CURVE_V2	Undervoltage magnitude where VArs are at minimum. Per unit value based on NP AC Vnom. (Voltage base).
QV_CURVE_Q2	VArs at V2. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QV_CURVE_V3	Overvoltage magnitude where VArs are at minimum. Per unit value based on NP AC Vnom. (Voltage base).
QV_CURVE_Q3	VArs at V3. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QV_CURVE_V1	Undervoltage magnitude where VArs are at maximum. Per unit value based on NP AC Vnom. (Voltage base).
QV_CURVE_Q1	VArs at V1. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QV_CURVE_V4	Overvoltage magnitude where VArs are at minimum. Per unit value based on NP AC Vnom. (Voltage base).
QV_CURVE_Q4	VArs at V4. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QV_OLRT	Volt VAr Open Loop Response time
QP_MODE_ENABLE	This function is deactivated by request from the Area EPS Operator

1547-2018 Parameter Label	Description
QP_CURVE_P3_GEN	Maximum Active Power_ Generating. Per unit value based on NP Pmax
QP_CURVE_P2_GEN	Medium Active Power_ Generating Per unit value based on NP Pmax
QP_CURVE_P1_GEN	Lower Active Power_ Generating. Per unit value based on NP Pmax
QP_CURVE_P1_LOAD	Lower Active Power_ Absorbing. Per unit value based on NP Pmax Charge
QP_CURVE_P2_LOAD	Medium Active Power_ Absorbing. Per unit value based on NP Pmax Charge
QP_CURVE_P3_LOAD	Maximum Active Power_ Absorbing. Per unit value based on NP Pmax Charge
QP_CURVE_Q3_GEN	Maximum Reactive Power while Generating. . Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QP_CURVE_Q2_GEN	Medium Reactive Power while Generating. . Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QP_CURVE_Q1_GEN	Lower Reactive Power while Generating. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QP_CURVE_Q1_LOAD	Maximum Reactive Power while Absorbing. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QP_CURVE_Q2_LOAD	Medium Reactive Power while Absorbing. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
QP_CURVE_Q3_LOAD	Lower Reactive Power while Absorbing. Per unit value based on NP Qmax Abs or NP Qmax Inj. Negative signs should not be used but if present indicate absorbing VAr.
PV_MODE_ENABLE	This function is activated by request from the Area EPS Operator
PV_CURVE_V1	Upper start voltage for power reduction. Per unit value based on NP AC Vnom. (Votage base)
PV_CURVE_P1	Active power level at V1. Per unit value based on NP AC Vnom. (Votage base)
PV_CURVE_V2	Upper voltage for maximum power reduction. Per unit value based on NP AC Vnom. (Votage base)

1547-2018 Parameter Label	Description
PV_CURVE_P2_GEN	Minimum active power generating at V2_ the lesser of 0.2*Prated or Pmin. Per unit value based on NP Pmax
PV_CURVE_P2_LOAD	Applicable to DER which can generate and absorb active power. Per unit Value based on NP Pmax Charge. Negative values indicate active power load. P'2 indicates maximum active power absorption
OV2_TRIP_V	Must Trip Magnitude. Per unit value based on NP AC Vnom.. (Votage base)
OV2_TRIP_T	Must Trip Duration
OV1_TRIP_V	Must Trip Magnitude. Per unit value based on NP AC Vnom.. (Votage base)
OV1_TRIP_T	Must Trip Duration
UV1_TRIP_V	Must Trip Magnitude. Per unit value based on NP AC Vnom.. (Votage base)
UV1_TRIP_T	Must Trip Duration
UV2_TRIP_V	Must Trip Magnitude. Per unit value based on NP AC Vnom.. (Votage base)
UV2_TRIP_T	Must Trip Duration
OF2_TRIP_F	Must Trip frequency Magnitude. Frequency values shall be reported to 3 decimal places
OF2_TRIP_T	Must Trip Duration
OF1_TRIP_F	Must Trip frequency Magnitude. Frequency values shall be reported to 3 decimal places
OF1_TRIP_T	Must Trip Duration
UF1_TRIP_F	Must Trip frequency Magnitude. Frequency values shall be reported to 3 decimal places
UF1_TRIP_T	Must Trip Duration
UF2_TRIP_F	Must Trip frequency Magnitude. Frequency values shall be reported to 3 decimal places
UF2_TRIP_T	Must Trip Duration

1547-2018 Parameter Label	Description
PF_DBOF	Over Frequency deadband offset from nominal frequency in Hz. Frequency values shall be reported to 3 decimal places
PF_DBUF	Under Frequency deadband offset from nominal frequency in Hz. Frequency values shall be reported to 3 decimal places
PF_KOF	Over frequency per unit frequency change corresponding to a 1 per unit power change (frequency droop)
PF_KUF	Under frequency per unit frequency change corresponding to a 1 per unit power change (frequency droop)
PF_OLRT	Open Loop Response time
UI_MODE_ENABLE	Unintentional Islanding Mode (enabled/disabled). This function is enabled by default, and disabled only by request from the Area EPS Operator.